

## Appendix C. Additional Monitoring Results

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## C.0 Additional Monitoring Results

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This appendix contains additional information on monitoring results and supplements data summarized in the main body of the report.

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## C.1 Onsite Pond

**Table C-1. Selected Radionuclide Concentrations in West Lake Sediment.**

Radionuclide	2020				No. of Samples	2015-2019						DOE Biota Concentration Guides	
	No. of Samples	Concentration				No. of Samples	Concentration						
		Maximum <sup>a</sup>					Average <sup>b</sup>			Maximum <sup>a</sup>			
		pCi/g <sup>c</sup>		pCi/g <sup>c</sup>			pCi/g <sup>c</sup>		pCi/g <sup>c</sup>	pCi/g <sup>c</sup>			pCi/g <sup>c</sup>
Cesium-137	0		±		19	6.1E-01	±	7.2E-01	1.4E+00	±	1.3E-01	3.1E+03	
Gross Alpha <sup>d</sup>	0		±		19	9.0E+00	±	9.6E+00	2.3E+01	±	7.6E+00	N/A	
Gross Beta	0		±		19	2.4E+01	±	7.4E+00	3.0E+01	±	2.4E+00	N/A	
Strontium-90 <sup>d</sup>	0	N/A	±	N/A	19	1.6E-01	±	2.7E-01	4.4E-01	±	9.9E-02	5.8E+02	
Technetium-99 <sup>d</sup>	0		±		19	6.5E-02	±	4.4E-01	6.0E-01	±	2.8E-01	4.2E+04	
Uranium-234	0		±		19	2.6E+00	±	4.8E+00	9.6E+00	±	1.6E+00	5.3E+03	
Uranium-235 <sup>d</sup>	0		±		19	1.7E-01	±	3.0E-01	6.5E-01	±	1.6E-01	3.7E+03	
Uranium-238	0		±		19	2.5E+00	±	4.6E+00	9.3E+00	±	1.5E+00	2.5E+03	

<sup>a</sup> Result and maximum values are ± total propagated analytical uncertainty.

<sup>b</sup> Averages are ±2 standard deviations of the mean.

<sup>c</sup> 1 pCi = 0.037 Bq.

<sup>d</sup> Results include concentrations below detection limit.

Note: DOE-Derived Biota Concentration Guide values shown for Riparian Animal Receptor (DOE/EH-0676)

COVID-19 = Coronavirus Disease 2019 pandemic

CY = calendar year

DOE = U.S. Department of Energy

N/A = Not Applicable due to COVID-19; No collection attempts in CY 2020.

Table C-2. Radionuclide Concentrations in West Lake Surface Water.

Radionuclide	2020							2015-2019							DOE Biota Concentration Guides
	No. of samples	Concentration						No. of samples	Concentration						
		Average <sup>a</sup>			Maximum <sup>b</sup>				Average <sup>a</sup>			Maximum <sup>b</sup>			
		pCi/L			pCi/L				pCi/L			pCi/L			
Technetium <sup>c,e</sup>	0		±			6.7E+05		4	1.7E+02	±	5.6E+02	6.5E+02	±	9.8E+01	6.7E+05
Tritium <sup>d,e</sup>	0		±			2.7E+08		18	4.2E+01	±	1.9E+02	3.1E+02	±	1.4E+02	2.7E+08
Uranium-234 <sup>d</sup>	0	N/A	±	N/A	N/A	2.0E+02	N/A	18	9.6E+02	±	4.8E+03	1.1E+04	±	4.4E+03	2.0E+02
Uranium-235 <sup>d,e</sup>	0		±			2.2E+02		18	9.8E+01	±	6.4E+02	1.4E+03	±	1.6E+03	2.2E+02
Uranium-238 <sup>d</sup>	0		±			2.2E+02		18	1.1E+03	±	6.2E+03	1.4E+04	±	5.2E+03	2.2E+02

<sup>a</sup> Averages are ±2 standard deviations of the mean.

<sup>b</sup> Maximum values are ± total propagated analytical uncertainty.

<sup>c</sup> Biota Concentration Guide value for Riparian Animal receptor (DOE/EH-0676); Analytical Results shown include the years 2018 and 2019 only.

<sup>d</sup> Biota Concentration Guide value for Aquatic Animal receptor (DOE/EH-0676)

<sup>e</sup> Results include concentrations below detection limit.

COVID-19 = Coronavirus Disease 2019 pandemic

CY = calendar year

DOE = U.S. Department of Energy

N/A = Not Applicable due to COVID-19; No collection attempts in CY 2020

## C.2 Ambient Air

Table C-3. Concentrations of Select Radionuclides (pCi/m<sup>3</sup>)<sup>a</sup> in Onsite Air Samples. (4 Pages)

Radionuclide	Site	2020					2015 - 2019					EPA Table 2 <sup>e, f</sup>
		Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	
		Samples	Detects <sup>b</sup>				Samples	Detects <sup>b</sup>				
gross α	100	208	208	1.4E-03 ± 1.6E-03	6.7E-03 ± 1.2E-03	N588	960	942	1.6E-03 ± 2.2E-03	7.8E-03 ± 1.2E-03	N534	8.1E-02
	200-E	721	715	1.3E-03 ± 1.8E-03	1.0E-02 ± 2.7E-03	N158	3337	3256	1.6E-03 ± 2.2E-03	9.1E-03 ± 2.0E-03	N957	
	200-W	594	593	1.4E-03 ± 1.7E-03	6.1E-03 ± 1.1E-03	N456	2953	2920	1.9E-03 ± 5.8E-03	8.4E-02 ± 4.9E-03	N956	
	300	182	181	1.2E-03 ± 1.5E-03	4.4E-03 ± 9.5E-04	N905	872	798	1.1E-03 ± 1.7E-03	6.1E-03 ± 8.4E-04	N130	
	400	52	52	1.3E-03 ± 1.5E-03	4.4E-03 ± 9.5E-04	N911	255	230	1.0E-03 ± 1.6E-03	5.7E-03 ± 1.3E-03	N912	
	600	169	169	1.3E-03 ± 1.8E-03	7.2E-03 ± 1.7E-03	N928	678	614	1.2E-03 ± 1.9E-03	8.1E-03 ± 1.1E-03	N981	
	ERDF	126	126	1.3E-03 ± 1.8E-03	5.4E-03 ± 1.0E-03	N168	655	654	1.5E-03 ± 2.0E-03	9.3E-03 ± 1.1E-03	N963	
	Perimeter	283	276	1.1E-03 ± 1.1E-03	3.8E-03 ± 7.8E-04	N938	1420	1279	9.9E-04 ± 1.7E-03	7.7E-03 ± 1.0E-03	N934	
	Nearby Comm.	152	150	1.1E-03 ± 1.0E-03	2.9E-03 ± 9.1E-04	N944	905	811	9.5E-04 ± 1.4E-03	6.0E-03 ± 8.2E-04	N948	
	Dist. Comm.	21	21	9.0E-04 ± 1.2E-03	3.2E-03 ± 6.7E-04	N909	130	110	8.8E-04 ± 1.4E-03	3.8E-03 ± 6.4E-04	N909	
gross β	100	208	208	1.4E-02 ± 1.6E-02	4.4E-02 ± 1.7E-03	N535	960	960	1.7E-02 ± 2.1E-02	5.9E-02 ± 2.4E-03	N534	1.0E+02
	200-E	721	721	1.4E-02 ± 1.5E-02	4.5E-02 ± 2.5E-03	N532	3337	3337	1.6E-02 ± 2.1E-02	1.8E-01 ± 3.8E-03	N158	
	200-W	594	594	1.4E-02 ± 1.5E-02	4.4E-02 ± 2.5E-03	N168	2953	2952	1.6E-02 ± 1.9E-02	7.5E-02 ± 3.2E-03	N304	
	300	182	182	1.5E-02 ± 1.8E-02	7.4E-02 ± 3.6E-03	N905	872	872	1.8E-02 ± 2.1E-02	6.3E-02 ± 2.9E-03	N903	
	400	52	52	1.6E-02 ± 1.8E-02	6.0E-02 ± 2.9E-03	N911	255	255	1.9E-02 ± 2.1E-02	5.7E-02 ± 2.1E-03	N911	
	600	169	169	1.5E-02 ± 1.4E-02	4.0E-02 ± 2.1E-03	N589	678	678	1.8E-02 ± 2.2E-02	7.5E-02 ± 3.9E-03	N929	
	ERDF	126	126	1.4E-02 ± 1.6E-02	4.4E-02 ± 2.5E-03	N168	655	661	1.6E-02 ± 1.9E-02	5.8E-02 ± 7.2E-03	N482	
	Perimeter	283	283	1.5E-02 ± 1.4E-02	4.8E-02 ± 2.5E-03	N936	1420	1420	1.8E-02 ± 2.2E-02	7.6E-02 ± 3.5E-03	N937	
	Nearby Comm.	152	152	1.5E-02 ± 1.3E-02	4.0E-02 ± 2.5E-03	N944	905	905	1.8E-02 ± 2.2E-02	7.2E-02 ± 2.3E-03	N943	
	Dist. Comm.	21	21	1.3E-02 ± 1.3E-02	3.4E-02 ± 1.8E-03	N909	130	130	1.7E-02 ± 1.9E-02	5.2E-02 ± 2.4E-03	N909	
<sup>3</sup> H	100	13	0	5.2E-01 ± 4.2E+00	5.0E+00 ± 8.9E+00	N900	66	7	1.3E+00 ± 5.0E+00	1.2E+01 ± 2.5E+00	N900	1.5E+03
	200-E	26	0	1.4E+00 ± 3.8E+00	7.1E+00 ± 8.6E+00	N931	130	8	1.5E+00 ± 3.9E+00	9.8E+00 ± 4.8E+00	N920	
	300	77	8	2.2E+00 ± 6.7E+00	2.1E+01 ± 6.0E+00	N918	373	108	4.6E+00 ± 1.3E+01	9.0E+01 ± 1.8E+01	N130	
	400	13	0	-5.7E-02 ± 2.9E+00	3.3E+00 ± 2.2E+00	N912	66	5	2.2E+00 ± 4.9E+00	9.7E+00 ± 2.4E+00	N912	
	Perimeter	91	1	1.2E+00 ± 3.8E+00	7.4E+00 ± 3.2E+00	N937	455	45	2.0E+00 ± 7.3E+00	4.4E+01 ± 9.0E+00	N937	
	Nearby Comm.	26	1	1.2E+00 ± 3.7E+00	4.4E+00 ± 4.9E+00	N944	130	15	3.8E+00 ± 3.6E+01	2.0E+02 ± 3.7E+01	N944	
	Dist Comm	11	0	-9.4E-02 ± 3.2E+00	3.3E+00 ± 3.2E+00	N909	65	5	1.5E+00 ± 4.4E+00	1.2E+01 ± 4.1E+00	N909	
	<sup>60</sup> Co	100	16	0	-1.1E-05 ± 1.7E-04	1.3E-04 ± 1.4E-04	N576	74	1	1.3E-04 ± 1.9E-03	8.1E-03 ± 2.7E-03	
200-E		56	0	-2.1E-06 ± 1.4E-04	1.6E-04 ± 1.6E-04	N582	311	2	2.9E-05 ± 1.1E-03	7.4E-03 ± 7.5E-03	N158	
200-W		46	0	-1.2E-05 ± 1.1E-04	1.2E-04 ± 1.3E-04	N974	230	0	1.0E-05 ± 3.0E-04	6.6E-04 ± 5.8E-04	N975	
300		14	0	-6.2E-05 ± 3.2E-04	1.1E-04 ± 1.4E-04	N918	68	1	9.4E-05 ± 1.9E-03	7.6E-03 ± 1.4E-03	N905	
400		4	0	4.0E-05 ± 9.4E-05	9.6E-05 ± 9.9E-05	N911	20	0	3.7E-05 ± 3.8E-04	4.3E-04 ± 4.2E-04	N912	
600		14	0	1.7E-05 ± 1.4E-04	1.8E-04 ± 2.7E-04	N928	56	0	2.8E-05 ± 2.3E-04	3.0E-04 ± 4.1E-04	N906	

Table C-3. Concentrations of Select Radionuclides (pCi/m<sup>3</sup>)<sup>a</sup> in Onsite Air Samples. (4 Pages)

Radionuclide	Site	2020					2015 - 2019					EPA Table 2 <sup>e, f</sup>
		Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	
		Samples	Detects <sup>b</sup>				Samples	Detects <sup>b</sup>				
<sup>90</sup> Sr	ERDF	10	0	1.7E-06 ± 1.0E-04	8.0E-05 ± 1.3E-04	N168	50	0	-1.3E-05 ± 2.6E-04	2.0E-04 ± 1.9E-04	N517	1.9E-02
	Perimeter	22	0	-1.7E-06 ± 1.3E-04	1.1E-04 ± 1.1E-04	N940	114	0	3.0E-06 ± 4.9E-04	2.2E-03 ± 1.2E-03	N941	
	Nearby Comm.	13	0	-8.3E-07 ± 1.3E-04	1.3E-04 ± 2.3E-04	N944	70	0	8.9E-05 ± 1.5E-03	6.1E-03 ± 1.2E-03	N945	
	Dist. Comm.	2	0	3.4E-06 ± 1.8E-04	6.7E-05 ± 1.4E-04	N909	10	0	4.4E-05 ± 2.9E-04	2.8E-04 ± 5.1E-04	N909	
	100	16	0	9.9E-05 ± 5.9E-04	4.2E-04 ± 6.2E-04	N534	74	0	-1.6E-05 ± 5.6E-04	7.5E-04 ± 5.9E-04	N576	
	200-E	56	0	1.7E-04 ± 5.4E-04	7.1E-04 ± 5.1E-04	N968	253	1	1.8E-05 ± 8.4E-04	5.2E-03 ± 1.5E-03	N158	
	200-W	46	0	7.6E-05 ± 4.9E-04	6.1E-04 ± 4.3E-04	N555	222	0	-1.9E-05 ± 6.0E-04	1.8E-03 ± 2.0E-03	N987	
	300	14	0	5.1E-05 ± 5.4E-04	6.6E-04 ± 5.0E-04	N130	68	0	-5.6E-06 ± 5.8E-04	1.0E-03 ± 8.0E-04	N557	
	400	4	0	1.3E-05 ± 4.6E-04	2.8E-04 ± 3.3E-04	N912	20	0	-7.3E-05 ± 5.6E-04	6.2E-04 ± 4.5E-04	N911	
	600	14	0	9.7E-05 ± 4.4E-04	6.0E-04 ± 5.6E-04	N981	47	0	3.2E-05 ± 4.9E-04	8.3E-04 ± 5.8E-04	N981	
<sup>137</sup> Cs	ERDF	10	0	-9.0E-05 ± 4.8E-04	2.8E-04 ± 5.5E-04	N482	50	0	6.3E-05 ± 5.2E-04	6.8E-04 ± 4.9E-04	N517	1.9E-02
	Perimeter	18	0	7.2E-05 ± 5.4E-04	6.9E-04 ± 5.3E-04	N936	90	0	-2.5E-05 ± 5.2E-04	7.8E-04 ± 6.3E-04	N941	
	Nearby Comm.	7	0	-1.3E-04 ± 6.9E-04	4.3E-04 ± 3.2E-04	N945	31	0	-8.1E-06 ± 4.3E-04	4.8E-04 ± 4.9E-04	N946	
	Dist. Comm.	2	0	-8.4E-05 ± 3.2E-04	2.7E-05 ± 1.8E-04	N909	10	0	-2.7E-05 ± 3.6E-04	3.8E-04 ± 4.3E-04	N909	
	100	16	0	3.1E-05 ± 1.2E-04	1.6E-04 ± 1.5E-04	N575	74	2	3.9E-05 ± 3.0E-04	4.9E-04 ± 9.1E-04	N588	
	200-E	56	6	9.7E-05 ± 5.1E-04	1.6E-03 ± 3.4E-04	N158	311	20	1.7E-04 ± 1.8E-03	1.0E-02 ± 1.5E-02	N969	
	200-W	46	1	2.5E-05 ± 1.6E-04	2.2E-04 ± 1.8E-04	N155	230	2	3.7E-05 ± 3.5E-04	8.7E-04 ± 5.1E-04	N155	
	300	14	0	3.6E-05 ± 2.2E-04	3.2E-04 ± 3.3E-04	N905	68	0	4.8E-05 ± 3.1E-04	4.4E-04 ± 5.0E-04	N904	
	400	4	0	5.7E-05 ± 6.8E-05	8.6E-05 ± 1.4E-04	N912	20	0	1.4E-05 ± 4.0E-04	3.2E-04 ± 4.5E-04	N911	
	600	14	0	3.7E-05 ± 1.7E-04	1.8E-04 ± 2.0E-04	N928	56	2	5.2E-05 ± 3.3E-04	6.4E-04 ± 3.4E-04	N906	
<sup>238</sup> Pu	ERDF	10	0	3.5E-05 ± 1.1E-04	1.2E-04 ± 2.3E-04	N168	50	0	1.4E-05 ± 2.4E-04	2.9E-04 ± 3.3E-04	N168	2.1E-03
	Perimeter	22	0	1.3E-05 ± 1.1E-04	1.4E-04 ± 1.1E-04	N907	114	1	5.3E-05 ± 2.8E-04	6.0E-04 ± 6.1E-04	N907	
	Nearby Comm.	13	0	2.3E-05 ± 1.1E-04	1.6E-04 ± 1.1E-04	N945	70	0	2.4E-05 ± 2.7E-04	3.8E-04 ± 5.1E-04	N947	
	Dist. Comm.	2	0	2.7E-05 ± 3.5E-05	4.0E-05 ± 1.0E-04	N909	10	0	2.4E-05 ± 2.6E-04	3.0E-04 ± 2.8E-04	N909	
	100	16	0	1.4E-06 ± 1.1E-05	1.7E-05 ± 2.0E-05	N588	74	0	1.2E-06 ± 1.4E-05	3.9E-05 ± 5.4E-05	N900	
	200-E	56	0	1.9E-07 ± 7.8E-06	1.4E-05 ± 2.7E-05	N584	259	3	6.5E-06 ± 1.8E-04	1.4E-03 ± 3.2E-04	N583	
	200-W	46	0	5.3E-07 ± 7.1E-06	1.0E-05 ± 1.6E-05	N442	230	10	5.4E-06 ± 6.1E-05	3.7E-04 ± 1.1E-04	N901	
	300	14	0	1.3E-06 ± 1.0E-05	1.2E-05 ± 1.5E-05	N557	68	0	-1.1E-07 ± 1.5E-05	1.9E-05 ± 4.4E-05	N904	
	400	4	0	-4.4E-07 ± 1.8E-06	6.9E-07 ± 7.2E-06	N912	20	0	-2.2E-06 ± 1.6E-05	2.0E-05 ± 3.6E-05	N912	
	600	14	0	4.0E-07 ± 5.9E-06	6.4E-06 ± 1.3E-05	N587	56	0	2.3E-07 ± 1.2E-05	2.1E-05 ± 2.7E-05	N928	
ERDF	10	0	2.9E-07 ± 6.8E-06	7.9E-06 ± 1.4E-05	N963	50	0	2.1E-06 ± 1.1E-05	2.0E-05 ± 3.0E-05	N482		
Perimeter	22	0	1.3E-06 ± 1.4E-05	2.5E-05 ± 3.7E-05	N941	94	0	8.2E-07 ± 1.6E-05	3.5E-05 ± 3.6E-05	N940		
Nearby Comm.	11	0	-7.1E-07 ± 1.3E-05	1.1E-05 ± 2.1E-05	N944	45	2	4.4E-07 ± 2.8E-05	5.9E-05 ± 2.2E-05	N944		
Dist. Comm.	2	0	2.5E-06 ± 6.5E-06	4.8E-06 ± 9.6E-06	N909	10	0	-2.6E-07 ± 8.2E-06	6.2E-06 ± 1.1E-05	N909		

Table C-3. Concentrations of Select Radionuclides (pCi/m<sup>3</sup>)<sup>a</sup> in Onsite Air Samples. (4 Pages)

Radionuclide	Site	2020					2015 - 2019					EPA Table 2 <sup>e, f</sup>
		Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	
		Samples	Detects <sup>b</sup>				Samples	Detects <sup>b</sup>				
<sup>239/240</sup> Pu	100	16	0	1.9E-06 ± 8.0E-06	9.0E-06 ± 1.3E-05	N535	74	0	6.3E-07 ± 1.4E-05	2.6E-05 ± 2.3E-05	N900	2.0E-03
	200-E	56	0	5.8E-07 ± 9.2E-06	1.9E-05 ± 3.0E-05	N932	259	1	6.6E-07 ± 2.1E-05	9.7E-05 ± 8.0E-05	N976	
	200-W	46	0	3.6E-06 ± 1.4E-05	2.6E-05 ± 2.6E-05	N165	230	42	7.0E-05 ± 6.7E-04	3.2E-03 ± 5.6E-04	N155	
	300	14	0	-2.0E-07 ± 7.2E-06	6.8E-06 ± 1.3E-05	N557	68	0	-2.2E-06 ± 1.3E-05	1.5E-05 ± 2.5E-05	N902	
	400	4	0	-3.0E-06 ± 7.3E-06	8.8E-07 ± 9.0E-06	N912	20	0	-2.6E-06 ± 1.3E-05	8.4E-06 ± 4.7E-05	N911	
	600	14	0	1.8E-06 ± 7.2E-06	8.5E-06 ± 2.0E-05	N930	56	0	-1.5E-07 ± 1.7E-05	2.9E-05 ± 3.4E-05	N928	
	ERDF	10	0	1.6E-06 ± 1.2E-05	9.8E-06 ± 1.9E-05	N517	50	4	8.4E-06 ± 4.2E-05	1.2E-04 ± 6.6E-05	N518	
	Perimeter	22	0	-9.7E-07 ± 1.1E-05	1.2E-05 ± 2.1E-05	N935	94	0	-4.2E-07 ± 1.4E-05	2.1E-05 ± 5.1E-05	N935	
	Nearby Comm.	11	0	-3.2E-07 ± 1.4E-05	9.1E-06 ± 2.1E-05	N944	45	1	-1.7E-06 ± 2.1E-05	1.5E-05 ± 2.0E-05	N946	
	Dist. Comm.	2	0	-1.3E-06 ± 4.2E-06	1.9E-07 ± 8.7E-06	N909	10	0	6.6E-07 ± 9.8E-06	1.2E-05 ± 4.6E-05	N909	
<sup>233/234</sup> U	100	16	1	8.4E-06 ± 2.0E-05	3.3E-05 ± 2.3E-05	N578	66	10	1.2E-05 ± 3.1E-05	8.4E-05 ± 7.8E-05	N576	7.7E-03
	200-E	56	4	1.2E-05 ± 2.8E-05	8.6E-05 ± 3.1E-05	N559	259	76	2.2E-05 ± 5.2E-05	1.7E-04 ± 4.6E-05	N924	
	200-W	46	4	1.1E-05 ± 2.4E-05	6.4E-05 ± 3.1E-05	N956	230	43	1.4E-05 ± 3.5E-05	9.9E-05 ± 7.4E-05	N901	
	300	14	0	1.2E-05 ± 1.7E-05	2.5E-05 ± 2.6E-05	N904	68	38	4.4E-05 ± 6.1E-05	1.2E-04 ± 7.0E-05	N903	
	600	14	3	2.3E-05 ± 6.1E-05	9.4E-05 ± 4.8E-05	N929	55	25	3.0E-05 ± 6.4E-05	1.7E-04 ± 1.3E-04	N929	
	ERDF	10	5	3.5E-05 ± 5.3E-05	6.8E-05 ± 3.3E-05	N482	47	9	8.4E-06 ± 1.8E-05	3.3E-05 ± 3.5E-05	N482	
	Perimeter	8	0	2.6E-05 ± 4.3E-05	4.5E-05 ± 4.0E-05	N935	40	30	5.8E-05 ± 6.5E-05	1.6E-04 ± 9.5E-05	N937	
	Nearby Comm.	10	2	2.2E-05 ± 4.8E-05	8.1E-05 ± 5.2E-05	N945	51	34	5.8E-05 ± 5.5E-05	1.5E-04 ± 1.4E-04	N943	
	Dist. Comm.	2	1	4.0E-05 ± 8.0E-05	6.8E-05 ± 3.8E-05	N909	10	6	4.2E-05 ± 5.0E-05	8.8E-05 ± 5.1E-05	N909	
	<sup>235</sup> U	100	16	0	2.9E-06 ± 9.0E-06	1.4E-05 ± 2.5E-05	N588	66	1	3.8E-06 ± 1.6E-05	4.5E-05 ± 7.1E-05	
200-E		56	1	2.2E-06 ± 8.9E-06	1.4E-05 ± 1.4E-05	N559	259	6	5.1E-06 ± 1.9E-05	7.6E-05 ± 7.9E-05	N582	
200-W		46	0	2.0E-06 ± 6.8E-06	1.2E-05 ± 1.5E-05	N168	230	5	5.3E-06 ± 1.8E-05	6.9E-05 ± 4.7E-05	N161	
300		14	0	1.9E-06 ± 1.0E-05	1.2E-05 ± 2.1E-05	N904	68	5	1.1E-05 ± 3.1E-05	6.7E-05 ± 5.9E-05	N903	
600		14	0	1.8E-06 ± 8.0E-06	7.6E-06 ± 2.1E-05	N930	55	6	1.1E-05 ± 2.9E-05	6.5E-05 ± 4.4E-05	N928	
ERDF		10	0	2.8E-06 ± 9.8E-06	1.2E-05 ± 1.5E-05	N168	47	1	1.8E-06 ± 7.8E-06	1.4E-05 ± 1.1E-05	N963	
Perimeter		8	0	7.8E-06 ± 3.5E-05	4.6E-05 ± 6.6E-05	N937	40	4	1.1E-05 ± 3.5E-05	8.4E-05 ± 7.7E-05	N937	
Nearby Comm.		10	0	1.6E-06 ± 1.2E-05	1.1E-05 ± 2.3E-05	N943	51	5	1.5E-05 ± 4.3E-05	8.9E-05 ± 8.9E-05	N944	
Dist. Comm.		2	0	1.7E-06 ± 4.7E-06	3.3E-06 ± 1.5E-05	N909	10	2	9.9E-06 ± 2.8E-05	3.3E-05 ± 2.9E-05	N909	
<sup>238</sup> U		100	16	4	1.2E-05 ± 2.0E-05	3.7E-05 ± 3.3E-05	N588	66	11	8.6E-06 ± 2.5E-05	7.1E-05 ± 7.3E-05	N578
	200-E	56	8	1.3E-05 ± 2.5E-05	8.0E-05 ± 3.0E-05	N559	259	74	1.8E-05 ± 4.6E-05	1.6E-04 ± 4.3E-05	N984	
	200-W	46	10	1.0E-05 ± 1.5E-05	2.9E-05 ± 2.3E-05	N449	230	42	9.6E-06 ± 2.0E-05	6.6E-05 ± 5.8E-05	N901	
	300	14	2	1.3E-05 ± 1.7E-05	2.8E-05 ± 2.8E-05	N904	68	39	3.7E-05 ± 4.7E-05	1.0E-04 ± 5.9E-05	N902	
	600	14	3	2.2E-05 ± 7.0E-05	1.2E-04 ± 5.5E-05	N929	55	24	2.8E-05 ± 4.4E-05	9.0E-05 ± 4.6E-05	N929	
	ERDF	10	4	3.1E-05 ± 5.1E-05	8.2E-05 ± 3.7E-05	N482	50	14	1.0E-05 ± 2.2E-05	5.3E-05 ± 7.8E-05	N518	
	Perimeter	8	3	3.6E-05 ± 8.4E-05	1.2E-04 ± 8.6E-05	N937	40	28	4.7E-05 ± 5.3E-05	1.7E-04 ± 9.3E-05	N935	

Table C-3. Concentrations of Select Radionuclides (pCi/m<sup>3</sup>)<sup>a</sup> in Onsite Air Samples. (4 Pages)

Radionuclide	Site	2020					2015 - 2019					EPA Table 2 <sup>e, f</sup>
		Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	Number of		Average <sup>c</sup>	Maximum <sup>d</sup>	Sampler	
		Samples	Detects <sup>b</sup>				Samples	Detects <sup>b</sup>				
	Nearby Comm.	10	4	2.6E-05 ± 2.5E-05	4.5E-05 ± 2.5E-05	N949	51	38	5.3E-05 ± 5.6E-05	1.5E-04 ± 7.0E-05	N945	
	Dist Comm	2	2	5.3E-05 ± 6.9E-05	7.7E-05 ± 4.0E-05	N909	10	5	3.0E-05 ± 3.3E-05	5.6E-05 ± 2.0E-05	N909	
<sup>241</sup> Am	100	16	0	3.6E-06 ± 1.7E-05	2.9E-05 ± 3.3E-05	N588	72	0	1.5E-05 ± 2.6E-04	9.0E-04 ± 2.5E-03	N900	1.9E-03
	200-E	28	0	3.4E-06 ± 1.4E-05	1.7E-05 ± 2.4E-05	N984	211	0	1.4E-04 ± 3.9E-03	1.9E-02 ± 2.8E-02	N969	
	200-W	24	0	4.2E-06 ± 9.2E-06	1.6E-05 ± 1.7E-05	N441	186	25	-2.6E-05 ± 1.1E-03	2.3E-03 ± 2.7E-03	N165	
	600	6	0	1.5E-06 ± 1.0E-05	9.7E-06 ± 1.7E-05	N981	40	0	5.0E-05 ± 1.6E-03	2.2E-03 ± 2.6E-03	N929	
	ERDF	4	0	3.3E-06 ± 3.4E-06	4.9E-06 ± 1.1E-05	N168	20	0	-3.5E-05 ± 1.0E-03	1.1E-03 ± 1.7E-03	N168	
	Perimeter	20	0	5.2E-06 ± 1.8E-05	2.8E-05 ± 3.6E-05	N936	106	1	-1.7E-05 ± 1.1E-03	1.7E-03 ± 1.9E-03	N933	
	Nearby Comm.	11	0	1.9E-06 ± 1.0E-05	8.9E-06 ± 1.8E-05	N943	66	0	-2.5E-05 ± 1.1E-03	2.8E-03 ± 2.0E-03	N949	
	Dist. Comm.	2	0	-4.2E-06 ± 4.4E-06	-2.7E-06 ± 1.5E-05	N909	10	0	-4.2E-06 ± 1.3E-04	1.5E-04 ± 1.6E-03	N909	
<sup>241</sup> Pu	100	14	0	1.2E-03 ± 3.6E-03	5.0E-03 ± 3.4E-03	N535	62	0	3.3E-05 ± 1.1E-03	2.7E-03 ± 3.2E-03	N534	1.0E-01
	200-E	4	0	-2.6E-04 ± 1.8E-03	5.6E-04 ± 2.0E-03	N480	20	0	-1.6E-04 ± 9.8E-04	6.1E-04 ± 9.5E-04	N481	
	200-W	24	0	4.0E-04 ± 2.9E-03	3.1E-03 ± 3.0E-03	N555	82	5	2.0E-04 ± 1.6E-03	4.3E-03 ± 1.3E-03	N975	
	600	2	0	1.5E-03 ± 4.7E-03	3.2E-03 ± 3.5E-03	N587	4	0	2.2E-04 ± 8.4E-04	6.5E-04 ± 7.2E-04	N587	
	ERDF	4	0	2.9E-04 ± 3.6E-03	2.3E-03 ± 3.4E-03	N963	7	0	3.3E-04 ± 5.9E-04	8.2E-04 ± 9.0E-04	N168	

<sup>a</sup> 1 pCi = 0.037 Bq<sup>b</sup> Number of samples with measurable concentrations of contaminant.<sup>c</sup> Average ± two standard deviations of all samples analyzed.<sup>d</sup> Maximum ± analytical uncertainty<sup>e</sup> EPA values are based on an effective dose equivalent of 10 mrem/yr (40 CFR 61, Appendix E, Table 2)<sup>f</sup> DCSs shown for gross α and β

DCS = derived concentration standard

EPA = U.S. Environmental Protection Agency

ERDF = Environmental Restoration Disposal Facility

## C.3 Surface Soil

Table C-4. Concentrations of Select Radionuclides (pCi/g)<sup>a</sup> in Hanford Site Soil Samples. (2 Pages)

Radionuclide	Hanford Area	2020								2015 - 2019							
		Number of		Average <sup>c</sup> (pCi/g)	Maximum <sup>d</sup> (pCi/g)		Location	Number of		Average <sup>c</sup> (pCi/g)	Maximum <sup>d</sup> (pCi/g)		Location				
		Samples	Detects <sup>b</sup>					Samples	Detects <sup>b</sup>								
<sup>241</sup> Am	200-W	24	18	3.1E-02 ± 7.4E-02	1.7E-01 ± 2.6E-02	D032	75	51	3.4E-02 ± 9.6E-02	2.5E-01 ± 8.3E-02	D032						
<sup>137</sup> Cs	200-E	10	10	1.3E+00 ± 3.5E+00	5.4E+00 ± 4.8E-01	D058	68	67	3.0E+00 ± 1.0E+01	1.8E+01 ± 1.5E+00	D054						
	200-W	24	24	1.1E+00 ± 2.8E+00	5.8E+00 ± 4.8E-01	D030	135	135	1.2E+00 ± 2.6E+00	7.8E+00 ± 6.4E-01	D030						
	300	8	3	3.5E-02 ± 8.4E-02	1.1E-01 ± 4.0E-02	D125	40	22	3.9E-02 ± 1.1E-01	2.9E-01 ± 3.2E-02	D125						
	400	1	1	2.4E-02 <sup>(3)</sup>	2.4E-02 ± 1.4E-02	D130	5	5	3.2E-02 ± 2.7E-02	5.3E-02 ± 1.5E-02	D130						
	600	16	15	3.7E-01 ± 8.3E-01	1.5E+00 ± 1.6E-01	D104	85	83	4.5E-01 ± 9.5E-01	2.5E+00 ± 2.9E-01	D091						
<sup>238</sup> Pu	200-E	10	0	-3.2E-04 ± 5.0E-03	2.8E-03 ± 4.4E-03	D058	68	17	1.1E-03 ± 6.5E-03	1.3E-02 ± 1.5E-02	D073						
	200-W	24	13	2.9E-03 ± 7.8E-03	1.4E-02 ± 5.4E-03	D032	135	55	9.9E-03 ± 4.7E-02	1.5E-01 ± 4.1E-02	D005						
	300	8	3	1.9E-03 ± 4.3E-03	5.0E-03 ± 2.1E-03	D120	40	6	1.7E-03 ± 7.5E-03	1.2E-02 ± 7.6E-03	D126						
	400	1	0	5.5E-04 <sup>(3)</sup>	5.5E-04 ± 3.2E-03	D130	5	1	2.3E-03 ± 4.9E-03	5.7E-03 ± 9.7E-03	D130						
	600	16	5	3.1E-03 ± 4.0E-03	6.5E-03 ± 3.7E-03	D108	85	18	2.2E-03 ± 9.5E-03	2.4E-02 ± 1.8E-02	D107						
<sup>239/240</sup> Pu	200-E	10	2	4.2E-03 ± 1.3E-02	1.8E-02 ± 7.3E-03	D076	68	42	1.7E-02 ± 3.5E-02	8.4E-02 ± 2.0E-02	D078						
	200-W	24	24	1.1E-01 ± 3.5E-01	8.3E-01 ± 9.5E-02	D032	135	121	1.1E-01 ± 3.5E-01	1.1E+00 ± 1.3E-01	D032						
	300	8	2	3.3E-03 ± 1.3E-02	1.9E-02 ± 3.5E-03	D121	40	18	6.1E-03 ± 2.4E-02	4.7E-02 ± 2.1E-02	D121						
	400	1	0	-1.3E-03 <sup>(3)</sup>	-1.3E-03 ± 2.3E-03	D130	5	2	8.6E-04 ± 2.7E-03	2.1E-03 ± 7.9E-04	D130						
	600	16	10	3.2E-02 ± 1.1E-01	2.2E-01 ± 2.4E-02	D108	85	58	6.4E-02 ± 4.0E-01	1.6E+00 ± 1.8E-01	D107						
<sup>90</sup> Sr	200-E	10	8	6.4E-02 ± 1.1E-01	2.1E-01 ± 6.0E-02	D058	68	41	2.2E-01 ± 8.5E-01	2.2E+00 ± 4.2E-01	D064						
	200-W	24	8	8.1E-02 ± 2.6E-01	6.1E-01 ± 1.2E-01	D032	117	69	1.4E-01 ± 6.3E-01	3.1E+00 ± 6.0E-01	D009						
	300	8	3	2.6E-02 ± 5.8E-02	7.7E-02 ± 2.5E-02	D120	40	1	6.2E-03 ± 6.3E-02	1.4E-01 ± 4.8E-02	D121						
	400	1	0	3.8E-03 <sup>(3)</sup>	3.8E-03 ± 2.3E-02	D130	5	0	-2.2E-03 ± 2.7E-02	1.5E-02 ± 2.8E-02	D130						
	600	16	6	5.1E-02 ± 1.2E-01	2.1E-01 ± 6.2E-02	D104	85	31	6.3E-02 ± 2.5E-01	1.0E+00 ± 2.0E-01	D091						
<sup>233/234</sup> U	200-E	10	10	4.6E-01 ± 8.2E-02	5.2E-01 ± 7.5E-02	D058	68	68	5.3E-01 ± 2.3E-01	9.4E-01 ± 1.4E-01	D063						
	200-W	24	24	4.8E-01 ± 1.5E-01	7.3E-01 ± 1.0E-01	D034	117	117	4.9E-01 ± 1.8E-01	7.1E-01 ± 1.1E-01	D024						
	300	8	8	6.7E-01 ± 5.8E-01	1.2E+00 ± 1.4E-01	D126	40	40	7.7E-01 ± 9.8E-01	2.3E+00 ± 3.7E-01	D126						
	400	1	1	3.4E-01 <sup>(3)</sup>	3.4E-01 ± 6.3E-02	D130	5	5	4.6E-01 ± 1.8E-01	5.8E-01 ± 1.1E-01	D130						
	600	16	16	4.6E-01 ± 1.6E-01	5.9E-01 ± 8.6E-02	D092	85	85	5.2E-01 ± 2.2E-01	9.3E-01 ± 1.6E-01	D091						
<sup>235</sup> U	200-E	10	6	3.2E-02 ± 3.3E-02	5.9E-02 ± 3.9E-02	D112	68	60	5.4E-02 ± 5.4E-02	1.1E-01 ± 5.0E-02	D059						
	200-W	24	15	3.0E-02 ± 2.1E-02	4.7E-02 ± 2.8E-02	D040	117	91	4.9E-02 ± 4.5E-02	1.1E-01 ± 5.0E-02	D026						
	300	8	6	4.4E-02 ± 5.3E-02	1.0E-01 ± 3.6E-02	D126	40	34	7.1E-02 ± 8.5E-02	1.9E-01 ± 7.5E-02	D126						
	400	1	0	3.0E-02 <sup>(3)</sup>	3.0E-02 ± 2.5E-02	D130	5	5	4.8E-02 ± 3.7E-02	7.7E-02 ± 4.1E-02	D130						
	600	16	6	2.7E-02 ± 3.6E-02	5.3E-02 ± 2.6E-02	D110	85	73	5.3E-02 ± 5.3E-02	1.2E-01 ± 5.3E-02	D094						
<sup>238</sup> U	200-E	10	10	4.6E-01 ± 9.3E-02	5.2E-01 ± 7.4E-02	D058	68	68	5.2E-01 ± 2.4E-01	1.0E+00 ± 1.6E-01	D063						
	200-W	24	24	5.0E-01 ± 2.1E-01	9.2E-01 ± 1.2E-01	D034	117	117	4.9E-01 ± 1.7E-01	6.6E-01 ± 1.3E-01	D046						
	300	8	8	6.7E-01 ± 5.3E-01	1.0E+00 ± 1.2E-01	D126	40	40	7.2E-01 ± 8.7E-01	2.2E+00 ± 3.5E-01	D126						

**Table C-4. Concentrations of Select Radionuclides (pCi/g)<sup>a</sup> in Hanford Site Soil Samples. (2 Pages)**

Radionuclide	Hanford Area	2020							2015 - 2019								
		Number of		Average <sup>c</sup> (pCi/g)	Maximum <sup>d</sup> (pCi/g)			Location	Number of		Average <sup>c</sup> (pCi/g)			Maximum <sup>d</sup> (pCi/g)			Location
		Samples	Detects <sup>b</sup>						Samples	Detects <sup>b</sup>							
	400	1	1	3.3E-01 <sup>(3)</sup>	3.3E-01 ± 5.7E-02			D130	5	5	4.5E-01 ± 1.2E-01			5.3E-01 ± 1.0E-01			D130
	600	16	16	4.5E-01 ± 1.4E-01	6.0E-01 ± 8.4E-02			D092	85	85	5.3E-01 ± 2.2E-01			9.7E-01 ± 1.5E-01			D094

<sup>a</sup> 1 pCi = 0.037 Bq

<sup>b</sup> Number of samples with measurable concentrations of contaminant

<sup>c</sup> Average ± two standard deviations of all samples analyzed

<sup>d</sup> Maximum ± analytical uncertainty

<sup>e</sup> Standard deviation cannot be calculated for one sample.

C.4 Columbia River Water

Table C-5. Radionuclide Concentrations in Columbia River Water (Richland, Washington).

Radionuclide <sup>b</sup>		2020								2015-2019								WA Ambient Surface Water Quality Standard <sup>d</sup>
		Number of		Concentration <sup>a</sup>						Number of		Concentration <sup>a</sup>						
		Samples	Detects	Maximum (pCi/L) <sup>c</sup>		Average(pCi/L)				Samples	Detects	Maximum (pCi/L) <sup>c</sup>		Average(pCi/L) <sup>c</sup>				
<b>Composite System</b>																		
Strontium-90		14	0	3.35E-02	±	3.60E-02	8.39E-03	±	3.02E-02	67	0	5.84E-02	±	3.93E-02	1.25E-02	±	4.33E-02	8
Tritium		12	12	3.61E+01	±	1.15E+01	2.60E+01	±	1.20E+01	68	65	5.20E+01	±	1.61E+01	2.63E+01	±	1.91E+01	20000
Technetium-99		14	1	1.38E+00	±	5.56E-01	1.27E-01	±	8.48E-01	67	2	1.63E+00	±	1.03E+00	1.57E-01	±	9.10E-01	900
Plutonium-238 <sup>e</sup>		--	--	--	-	--	--	-	--	12	0	6.70E-03	±	9.54E-03	8.75E-04	±	6.55E-03	--
Plutonium-239/240 <sup>e</sup>		--	--	--	-	--	--	-	--	12	0	5.78E-03	±	6.88E-03	-1.64E-03	±	1.34E-02	--
Uranium-234		14	14	3.77E-01	±	6.32E-02	2.81E-01	±	9.81E-02	68	68	4.10E-01	±	7.32E-02	2.90E-01	±	1.00E-01	--
Uranium-235		14	4	3.31E-02	±	2.00E-02	1.47E-02	±	1.89E-02	68	26	7.93E-02	±	2.98E-02	2.36E-02	±	3.29E-02	--
Uranium-238		14	14	3.44E-01	±	7.40E-02	2.40E-01	±	5.98E-02	68	67	3.04E-01	±	8.17E-02	2.27E-01	±	8.06E-02	--
<b>Continuous System</b>																		
Cesium-137	P <sup>b</sup>	12	0	1.99E-03	±	3.83E-03	7.78E-05	±	2.47E-03	51	0	2.35E-03	±	-1.01E-04	-1.01E-04	±	2.09E-03	200
	D <sup>b</sup>	12	0	2.83E-03	±	4.21E-03	2.74E-04	±	2.98E-03	51	1	6.85E-03	±	6.64E-03	3.64E-05	±	4.31E-03	
Plutonium-238 <sup>f</sup>	P <sup>b</sup>	12	0	9.93E-05	±	1.34E-04	-1.59E-05	±	1.15E-04	51	0	7.00E-05	±	7.31E-05	-5.29E-06	±	6.16E-05	600
	D <sup>b</sup>	12	1	1.80E-04	±	8.27E-05	6.56E-06	±	1.32E-04	55	2	7.92E-04	±	3.12E-04	2.37E-05	±	2.42E-04	
Plutonium-239/240 <sup>f</sup>	P <sup>b</sup>	12	0	4.32E-05	±	8.27E-05	3.68E-06	±	6.58E-05	51	0	9.66E-05	±	1.90E-04	1.51E-06	±	8.34E-05	--
	D <sup>b</sup>	12	0	-1.16E-05	±	8.21E-05	-1.60E-05	±	8.84E-05	51	0	1.81E-04	±	1.06E-04	6.52E-06	±	1.41E-04	

<sup>a</sup> Maximum values are ± total propagated analytical uncertainty (2 sigma). Averages are ±2 standard deviations of the mean.

<sup>b</sup> Radionuclides measured using the continuous system show the dissolved (D) and the particulate (P) fractions separately. Other radionuclides are based on unfiltered water samples collected by the composite system (see Section 7.2).

<sup>c</sup> 1 pCi = 0.037 Bq.

<sup>d</sup> WAC 173-201A-250 and EPA-570/9-76-003; WAC 246-290; 40 CFR 141.

<sup>e</sup> Richland composite water was analyzed from July of 2017 through June of 2018 as the continuous system was down; No filter/resin data is available for this time.

<sup>f</sup> Plutonium-238 and plutonium-239/240 were analyzed quarterly in 2014.

Note: Dashes indicate no concentration guides available; Number of samples and analyses may not match due to facility closures, duplicate samples, etc.

WA = Washington State.

**Table C-6. Radionuclide Concentrations in Columbia River Water (Priest Rapids Dam, Washington).**

Radionuclide <sup>b</sup>		2020							2015-2019							WA Ambient Surface Water Quality Standard <sup>d</sup>		
		Number of		Concentration <sup>a</sup>					Number of		Concentration <sup>a</sup>							
		Samples	Detects	Maximum (pCi/L) <sup>c</sup>		Average(pCi/L) <sup>c</sup>			Samples	Detects	Maximum (pCi/L) <sup>c</sup>		Average(pCi/L) <sup>c</sup>					
<b>Composite System</b>																		
Strontium-90		13	0	5.83E-02	±	3.80E-02	1.43E-02	±	5.31E-02	66	1	1.82E-01	±	5.38E-02	6.11E-03	±	6.15E-02	8
Tritium		13	13	2.04E+01	±	7.38E+00	1.69E+01	±	3.52E+00	68	63	2.98E+01	±	6.89E+00	1.57E+01	±	9.35E+00	20000
Technetium-99		13	1	1.65E+00	±	6.37E-01	1.47E-01	±	1.16E+00	67	0	1.67E+00	±	1.08E+00	1.53E-01	±	9.35E-01	900
Uranium-234		13	13	2.78E-01	±	6.09E-02	2.32E-01	±	6.35E-02	65	65	4.42E-01	±	8.71E-02	2.69E-01	±	9.14E-02	--
Uranium-235		13	4	2.38E-02	±	1.84E-02	1.23E-02	±	1.84E-02	65	32	7.37E-02	±	3.25E-02	2.57E-02	±	3.32E-02	--
Uranium-238		13	13	2.53E-01	±	4.82E-02	2.03E-01	±	5.98E-02	65	65	2.90E-01	±	5.90E-02	2.08E-01	±	5.69E-02	--
<b>Continuous System</b>																		
Cesium-137	P <sup>b</sup>	13	0	1.41E-03	±	1.72E-03	2.06E-05	±	1.26E-03	66	0	4.44E-03	±	2.09E-03	6.22E-05	±	1.90E-03	200
	D <sup>b</sup>	13	0	7.48E-03	±	4.46E-03	8.04E-04	±	4.37E-03	64	0	5.14E-03	±	6.64E-03	7.10E-04	±	3.75E-03	
Plutonium-238 <sup>f</sup>	P <sup>b</sup>	13	0	6.83E-05	±	7.51E-05	-4.20E-05	±	3.68E-04	66	0	2.28E-04	±	1.73E-04	3.87E-06	±	8.80E-05	600
	D <sup>b</sup>	13	0	7.02E-05	±	8.61E-05	-5.06E-06	±	6.69E-05	64	2	5.15E-04	±	1.69E-04	1.30E-05	±	2.18E-04	
Plutonium-239/240 <sup>f</sup>	P <sup>b</sup>	13	0	2.91E-05	±	8.06E-05	-2.92E-05	±	9.26E-05	66	1	1.32E-04	±	1.23E-04	-2.33E-06	±	8.12E-05	--
	D <sup>b</sup>	13	0	3.42E-05	±	9.63E-05	2.49E-05	±	1.50E-04	65	2	2.42E-04	±	2.35E-04	3.08E-05	±	1.16E-04	

<sup>a</sup> Maximum values are ± total propagated analytical uncertainty. Averages are ±2 standard deviations of the mean.

<sup>b</sup> Radionuclides measured using the continuous system show the particulate (P) and dissolved (D) fractions separately. Other radionuclides are based on unfiltered water samples collected by the composite system (see Section 7.2).

<sup>c</sup> 1 pCi = 0.037 Bq.

<sup>d</sup> WAC 173-201A-250 and EPA-570/9-76-003; WAC 246-290; 40 CFR 141.

<sup>e</sup> Does not apply to the Priest Rapids composite/continuous water system.

<sup>f</sup> Plutonium-238 and plutonium-239/240 were analyzed quarterly in 2014.

Note: Dashes indicate no concentration guides available; Number of samples and analyses may not match due to facility closures, duplicate samples, etc.

WA = Washington State

**Table C-7. 2020 Radionuclide Concentrations in Columbia River Transect Water Samples. (2 Pages)**

Transect/Radionuclide	No. of Detections	No. of Samples	Concentration <sup>a</sup>					
			Maximum <i>pCi/L<sup>b</sup></i>		Average <i>pCi/L<sup>b</sup></i>			
<b>Vernita Bridge (HRM 0.3)</b>								
Strontium-90 <sup>c</sup>	0	4	3.23E-02	±	3.59E-02	1.08E-03	±	5.24E-02
Technetium-99 <sup>c</sup>	0	4	-2.07E-03	±	3.90E-01	-1.25E-01	±	2.64E-01
Tritium	4	4	2.10E+01	±	7.59E+00	1.91E+01	±	2.85E+00
Uranium-234	4	4	2.52E-01	±	7.72E-02	2.25E-01	±	5.16E-02
Uranium-235 <sup>c</sup>	0	4	1.54E-02	±	2.37E-02	7.45E-03	±	1.23E-02
Uranium-238	4	4	2.51E-01	±	7.66E-02	1.76E-01	±	1.03E-01
<b>100N Area (HRM 9.5)</b>								
Strontium-90 <sup>c</sup>	0	6	5.24E-02	±	3.75E-02	1.35E-02	±	4.32E-02
Tritium	6	6	2.35E+01	±	8.30E+00	1.99E+01	±	5.19E+00
Uranium-234	6	6	2.42E-01	±	5.39E-02	2.02E-01	±	5.52E-02
Uranium-235 <sup>c</sup>	0	6	2.35E-02	±	2.00E-02	8.37E-03	±	2.15E-02
Uranium-238	6	6	1.74E-01	±	4.41E-02	1.63E-01	±	2.48E-02
<b>100H Area (HRM 15.3)</b>								
Strontium-90 <sup>c</sup>	0	5	4.03E-02	±	3.57E-02	1.78E-02	±	4.78E-02
Tritium	5	5	2.63E+01	±	8.96E+00	1.98E+01	±	6.75E+00
Uranium-234	5	5	2.59E-01	±	5.75E-02	2.15E-01	±	6.07E-02
Uranium-235	1	5	2.48E-02	±	2.11E-02	1.04E-02	±	2.02E-02
Uranium-238	5	5	2.06E-01	±	4.76E-02	1.90E-01	±	3.37E-02
<b>Hanford Townsite (HRM 28.7)</b>								
Strontium-90 <sup>c</sup>	0	5	2.42E-02	±	2.33E-02	5.38E-03	±	2.85E-02
Tritium	5	5	3.72E+02	±	1.77E+02	9.30E+01	±	2.80E+02
Uranium-234	5	5	2.56E-01	±	6.59E-02	2.38E-01	±	3.33E-02
Uranium-235 <sup>c</sup>	0	5	1.52E-02	±	2.36E-02	6.13E-03	±	1.15E-02

**Table C-7. 2020 Radionuclide Concentrations in Columbia River Transect Water Samples. (2 Pages)**

Transect/Radionuclide	No. of Detections	No. of Samples	Concentration <sup>a</sup>			
			Maximum <i>pCi/L<sup>b</sup></i>		Average <i>pCi/L<sup>b</sup></i>	
Uranium-238	5	5	2.11E-01	± 4.96E-02	1.73E-01	± 6.48E-02
<b>300 Area (HRM 43.1)</b>						
Strontium-90 <sup>c</sup>	0	5	4.92E-02	± 3.67E-02	1.92E-02	± 4.60E-02
Tritium	5	5	2.93E+01	± 9.77E+00	2.12E+01	± 8.50E+00
Uranium-234	5	5	2.60E-01	± 6.13E-02	2.25E-01	± 3.87E-02
Uranium-235	1	5	2.17E-02	± 1.85E-02	1.18E-02	± 1.68E-02
Uranium-236 <sup>c</sup>	0	2	1.38E-02	± 5.34E-02	6.45E-03	± 1.47E-02
Uranium-238	5	5	1.96E-01	± 5.08E-02	1.68E-01	± 4.99E-02
<b>Richland (HRM 46.4)</b>						
Strontium-90 <sup>c</sup>	0	11	3.57E-02	± 3.47E-02	8.38E-03	± 2.87E-02
Technetium-99 <sup>c</sup>	0	11	3.0E-01	± 5.51E-01	1.56E-01	± 2.02E-01
Tritium	10	11	3.75E+01	± 1.20E+01	1.82E+01	± 3.22E+01
Uranium-234	11	11	4.74E-01	± 9.74E-02	3.14E-01	± 1.31E-01
Uranium-235	1	11	2.97E-02	± 2.24E-02	1.33E-02	± 1.36E-02
Uranium-238	11	11	3.58E-01	± 7.98E-02	2.55E-01	± 8.94E-02
<sup>a</sup> Maximum values ± total propagated analytical uncertainty; Average values ± 2stdv. <sup>b</sup> 1 pCi = 0.037 Bq. <sup>c</sup> All value(s) reported are non-detects. HRM = Hanford river marker						

**Table C-8. Dissolved Metal Concentrations in Columbia River Transect Water Near Hanford Site.  
(5 Pages)**

Metal	No. of Samples	No. of Detections	Maximum ( $\mu\text{g/L}$ ) <sup>a</sup>	Minimum ( $\mu\text{g/L}$ ) <sup>a</sup>	Average ( $\mu\text{g/L}$ ) <sup>a,c</sup>	Minimum Detectable Concentrations ( $\mu\text{g/L}$ )	Washington State Ambient Surface Water Quality Chronic Toxicity Level <sup>b</sup>
<b>Vernita Bridge</b>							
Antimony	4	0	—	—	—	1	N/A
Arsenic	4	0	—	—	—	2	190
Beryllium	4	0	—	—	—	0.2	N/A
Cadmium	4	0	—	—	—	0.3	N/A
Chromium	4	0	—	—	—	3	10
Copper	4	4	0.63	0.60	0.61	0.3	6
Lead	4	0	—	—	—	0.5	1.1
Nickel	4	0	—	—	—	0.6	83
Selenium	4	0	—	—	—	2	5
Silver	4	0	—	—	—	0.3	N/A
Thallium	4	0	—	—	—	0.6	N/A
Uranium	4	4	0.54	0.48	0.51	0.067	30 <sup>d</sup>
Zinc	4	4	7.02	6.43	6.80	3.3	55
<b>100-N Area</b>							
Antimony	6	0	—	—	—	1	N/A
Arsenic	6	0	—	—	—	2	190
Beryllium	6	0	—	—	—	0.2	N/A
Cadmium	6	0	—	—	—	0.3	N/A
Chromium	6	0	—	—	—	3	10
Copper	6	6	0.58	0.51	0.54	0.3	6
Lead	6	0	—	—	—	0.5	1.1

**Table C-8. Dissolved Metal Concentrations in Columbia River Transect Water Near Hanford Site.  
(5 Pages)**

Metal	No. of Samples	No. of Detections	Maximum ( $\mu\text{g/L}$ ) <sup>a</sup>	Minimum ( $\mu\text{g/L}$ ) <sup>a</sup>	Average ( $\mu\text{g/L}$ ) <sup>a,c</sup>	Minimum Detectable Concentrations ( $\mu\text{g/L}$ )	Washington State Ambient Surface Water Quality Chronic Toxicity Level <sup>b</sup>
Nickel	6	0	—	—	—	0.6	83
Selenium	6	0	—	—	—	2	5
Silver	6	0	—	—	—	0.3	N/A
Thallium	6	0	—	—	—	0.6	N/A
Uranium	6	6	0.54	0.48	0.51	0.067	30 <sup>d</sup>
Zinc	6	4	7.56	3.30	4.42	3.3	55
<b>100-H Area</b>							
Antimony	5	0	—	—	—	1	N/A
Arsenic	5	0	—	—	—	2	190
Beryllium	5	0	—	—	—	0.2	N/A
Cadmium	5	0	—	—	—	0.3	N/A
Chromium	5	0	—	—	—	3	10
Copper	5	5	0.59	0.54	0.57	0.3	6
Lead	5	0	—	—	—	0.5	1.1
Nickel	5	0	—	—	—	0.6	83
Selenium	5	0	—	—	—	2	5
Silver	5	0	—	—	—	0.3	N/A
Thallium	5	0	—	—	—	0.6	N/A
Uranium	5	5	0.65	0.54	0.57	0.067	30 <sup>d</sup>
Zinc	5	2	5.27	3.30	3.74	3.3	55
<b>Hanford Townsite</b>							
Antimony	5	0	—	—	—	1	N/A

**Table C-8. Dissolved Metal Concentrations in Columbia River Transect Water Near Hanford Site.  
(5 Pages)**

Metal	No. of Samples	No. of Detections	Maximum ( $\mu\text{g/L}$ ) <sup>a</sup>	Minimum ( $\mu\text{g/L}$ ) <sup>a</sup>	Average ( $\mu\text{g/L}$ ) <sup>a,c</sup>	Minimum Detectable Concentrations ( $\mu\text{g/L}$ )	Washington State Ambient Surface Water Quality Chronic Toxicity Level <sup>b</sup>
Arsenic	5	0	—	—	—	2	190
Beryllium	5	0	—	—	—	0.2	N/A
Cadmium	5	0	—	—	—	0.3	N/A
Chromium	5	0	—	—	—	3	10
Copper	5	5	0.68	0.50	0.59	0.3	6
Lead	5	0	—	—	—	0.5	1.1
Nickel	5	0	—	—	—	0.6	83
Selenium	5	0	—	—	—	2	5
Silver	5	0	—	—	—	0.3	N/A
Thallium	5	0	—	—	—	0.6	N/A
Uranium	5	5	0.55	0.51	0.53	0.067	30 <sup>d</sup>
Zinc	5	5	9.84	5.46	6.79	3.3	55
<b>300 Area</b>							
Antimony	5	0	—	—	—	1	N/A
Arsenic	5	5	2.42	2.08	2.24	2	190
Beryllium	5	0	—	—	—	0.2	N/A
Cadmium	5	0	—	—	—	0.3	N/A
Chromium	5	0	—	—	—	3	10
Copper	5	4	0.71	0.55	0.60	0.3	6
Lead	5	0	—	—	—	0.5	1.1
Nickel	5	0	—	—	—	0.6	83
Selenium	5	0	—	—	—	2	5

**Table C-8. Dissolved Metal Concentrations in Columbia River Transect Water Near Hanford Site.  
(5 Pages)**

<b>Metal</b>	<b>No. of Samples</b>	<b>No. of Detections</b>	<b>Maximum (<math>\mu\text{g/L}</math>)<sup>a</sup></b>	<b>Minimum (<math>\mu\text{g/L}</math>)<sup>a</sup></b>	<b>Average (<math>\mu\text{g/L}</math>)<sup>a,c</sup></b>	<b>Minimum Detectable Concentrations (<math>\mu\text{g/L}</math>)</b>	<b>Washington State Ambient Surface Water Quality Chronic Toxicity Level<sup>b</sup></b>
Silver	5	0	—	—	—	0.3	N/A
Thallium	5	0	—	—	—	0.6	N/A
Uranium	5	5	0.59	0.50	0.54	0.067	30 <sup>d</sup>
Zinc	5	3	4.13	3.30	3.59	3.3	55
<b>Richland</b>							
Antimony	11	0	—	—	—	1	N/A
Arsenic	11	6	2.60	2.00	2.17	2	190
Beryllium	11	0	—	—	—	0.2	N/A
Cadmium	11	0	—	—	—	0.3	N/A
Chromium	11	0	—	—	—	3	10
Copper	11	11	0.81	0.46	0.56	0.3	6
Lead	11	0	—	—	—	0.5	1.1
Nickel	11	0	—	—	—	0.6	83
Selenium	11	0	—	—	—	2	5
Silver	11	0	—	—	—	0.3	N/A
Thallium	11	0	—	—	—	0.6	N/A
Uranium	11	11	1.12	0.56	0.78	0.067	30 <sup>d</sup>
Zinc	11	9	6.56	3.30	4.11	3.3	55

**Table C-8. Dissolved Metal Concentrations in Columbia River Transect Water Near Hanford Site. (5 Pages)**

Metal	No. of Samples	No. of Detections	Maximum ( $\mu\text{g/L}$ ) <sup>a</sup>	Minimum ( $\mu\text{g/L}$ ) <sup>a</sup>	Average ( $\mu\text{g/L}$ ) <sup>a,c</sup>	Minimum Detectable Concentrations ( $\mu\text{g/L}$ )	Washington State Ambient Surface Water Quality Chronic Toxicity Level <sup>b</sup>
<p><sup>a</sup> Dashes indicate results at or below minimum detectable concentrations.</p> <p><sup>b</sup> WAC 173-201A-240, and WAC 173-201A-250. Table 240(3) Toxic Substances Criteria for the protection of aquatic life. For hardness—dependent criteria, the minimum value of 47 mg CaCo<sub>3</sub>/L, for 1992 through 2000 water samples collected near Vernita Bridge by the U.S. Geological Survey was used. Parts per million (ppm) values are equivalent to the reported micrograms per liter (<math>\mu\text{g/L}</math>) concentrations shown.</p> <p><sup>c</sup> Average calculated using reporting limit values for all results above minimum detectable concentrations.</p> <p><sup>d</sup> EPA drinking water standard applied.</p> <p>EPA = U.S. Environmental Protection Agency</p>							

**Table C-9. Columbia River Organic Concentrations in Transect Water (2020). (2 Pages)**

Location	No. of Samples	Trichloroethane ( $\text{mg/L}$ ) <sup>b</sup>	cis-1,2-Dichloroethane ( $\text{mg/L}$ ) <sup>b</sup>	Regulatory Standard <sup>a</sup> ( $\text{mg/L}$ )
Richland Pumphouse-1 HRM 46.4	2	0.003	0.003	0.005
Richland Pumphouse-3 HRM 46.4	2	0.003	0.003	0.005
Richland Pumphouse-5 HRM 46.4	2	0.003	0.003	0.005
Richland Pumphouse-7 HRM 46.4	2	0.003	0.003	0.005
Richland Pumphouse-9 HRM 46.4	2	0.003	0.003	0.005
300 Area-1 HRM 43.1	1	0.003	0.003	0.005
300 Area-3 HRM 43.1	1	0.003	0.003	0.005
300 Area-5 HRM 43.1	1	0.003	0.003	0.005
300 Area-7 HRM 43.1	1	0.003	0.003	0.005
300 Area-9 HRM 43.1	1	0.003	0.003	0.005

**Table C-9. Columbia River Organic Concentrations in Transect Water (2020). (2 Pages)**

<b>Location</b>	<b>No. of Samples</b>	<b>Trichloroethane (mg/L)<sup>b</sup></b>	<b>cis-1,2-Dichloroethane (mg/L)<sup>b</sup></b>	<b>Regulatory Standard<sup>a</sup> (mg/L)</b>
Vernita-1 HRM 0.3	2	0.003	0.003	0.005
Vernita-2 HRM 0.3	1	0.003	0.003	0.005
Vernita-3 HRM 0.3	1	0.003	0.003	0.005
Vernita-4 HRM 0.3	1	0.003	0.003	0.005

<sup>a</sup>EPA Drinking Water Regulation Standard = 0.005 mg/L (both constituents)

<sup>b</sup>Maximum concentration reported was a non-detect.

EPA = U.S. Environmental Protection Agency

## C.5 Shoreline Seep Water

**Table C-10. Columbia River Organic Concentrations in Shoreline Seep Water (2020).**

Location	No. of Samples	Trichloroethene (mg/L) <sup>b</sup>	cis-1,2-Dichloroethene (mg/L) <sup>c</sup>	Regulatory Standard <sup>a</sup> (mg/L)
300 Area Spring DR 42-2	1	0.003	0.003	0.005
300 Area Spring 42-2	0	0.003	0.003	0.005
Hanford Townsite 25-4	2	0.003	0.003	0.005
100F Spring 107-1	1	0.003	0.003	0.005
100K Spring 63-1	1	0.003	0.003	0.005
100B Spring 39-2	1	0.003	0.003	0.005
100B Spring 38-3	1	0.003	0.003	0.005

<sup>a</sup>EPA Drinking Water Regulation Standard = 0.005 mg/L (both constituents)  
<sup>b</sup>Maximum concentration reported was a non-detect.  
<sup>c</sup>Maximum concentration reported was a non-detect.  
EPA = U.S. Environmental Protection Agency

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Table C-11. Radionuclide Concentrations in Columbia River and Shoreline Sediment (Near Hanford Site) (2015-2020). (2 Pages)

Sediment Location	Radionuclide	2020					2015-2019				
		No. of Samples	No. of Detects	Maximum Concentration <sup>a</sup> pCi/g		No. of Samples	No. of Detects	Average Concentration <sup>a</sup> pCi/g			
Adjacent to Locke Island	Cesium-137 <sup>b</sup>	1	0	8.29E-03	± 1.55E-02	6	0	7.29E-03	± 1.06E-02		
	Plutonium-239/240 <sup>b</sup>	1	0	-1.09E-03	± 4.14E-03	6	0	-1.53E-03	± 2.82E-03		
	Uranium-234	1	1	1.57E+00	± 2.24E-01	6	6	1.27E+00	± 2.55E-01		
	Uranium-235	1	1	7.41E-02	± 4.92E-02	6	6	1.24E-01	± 6.98E-02		
	Uranium-238	1	1	1.48E+00	± 2.14E-01	6	6	1.18E+00	± 1.79E-01		
Adjacent to Savage Island	Cesium-137 <sup>b</sup>	1	0	2.61E-02	± 3.17E-02	5	4	4.08E-02	± 1.90E-02		
	Plutonium-239/240	1	1	3.36E-03	± 2.50E-03	5	0	-6.30E-04	± 7.26E-03		
	Uranium-234	1	1	7.27E-01	± 1.31E-01	5	5	7.76E-01	± 3.03E-01		
	Uranium-235	1	1	3.48E-02	± 2.94E-02	5	4	8.47E-02	± 6.27E-02		
	Uranium-238	1	1	7.89E-01	± 1.36E-01	5	5	7.53E-01	± 2.41E-01		
100-D Spring 102-1	Cesium-137	2	2	8.58E-02	± 3.84E-02	10	10	1.04E-01	± 2.24E-02		
	Plutonium-239/240 <sup>b</sup>	2	0	3.16E-03	± 3.57E-03	10	3	3.42E-03	± 8.90E-03		
	Uranium-234	2	2	5.29E-01	± 1.10E-01	10	10	5.11E-01	± 1.03E-01		
	Uranium-235	2	2	4.69E-02	± 3.22E-02	10	9	4.92E-02	± 4.27E-02		
	Uranium-238	2	2	6.11E-01	± 1.13E-01	10	10	4.97E-01	± 7.80E-02		
100F Slough	Cesium-137	1	1	6.61E-02	± 2.24E-02	6	6	1.57E-01	± 7.03E-02		
	Plutonium-239/240 <sup>b</sup>	1	0	3.07E-04	± 2.00E-03	6	2	9.40E-04	± 3.05E-03		
	Uranium-234	1	1	7.34E-01	± 9.49E-02	6	6	6.34E-01	± 2.47E-01		
	Uranium-235 <sup>b</sup>	1	0	3.34E-02	± 2.51E-02	6	5	5.58E-02	± 2.32E-02		
	Uranium-238	1	1	6.39E-01	± 8.51E-02	6	6	5.74E-01	± 1.58E-01		
100-H Spring 145-1	Cesium-137	1	1	1.79E-01	± 3.21E-02	5	5	1.50E-01	± 6.97E-02		
	Plutonium-239/240	1	1	5.92E-03	± 4.10E-03	5	0	3.46E-03	± 1.98E-03		
	Uranium-234	1	1	8.91E-01	± 1.50E-01	5	5	7.36E-01	± 3.23E-01		
	Uranium-235	1	1	4.10E-02	± 3.50E-02	5	5	6.41E-02	± 4.19E-02		
	Uranium-238	1	1	8.79E-01	± 1.48E-01	5	5	6.90E-01	± 1.29E-01		
100-K Spring 63-1	Cesium-137	1	1	3.38E-02	± 2.07E-02	6	6	8.34E-02	± 6.91E-02		
	Plutonium-239/240 <sup>b</sup>	1	0	5.86E-04	± 1.99E-03	6	1	2.33E-03	± 7.86E-03		
	Uranium-234	1	1	8.20E-01	± 1.47E-01	6	6	1.09E+00	± 3.08E-01		
	Uranium-235	1	1	4.04E-02	± 3.45E-02	6	5	6.52E-02	± 3.80E-02		
	Uranium-238	1	1	8.41E-01	± 1.47E-01	6	6	9.93E-01	± 2.77E-01		
300 Area DR 42-2	Cesium-137	1	1	2.68E-01	± 4.42E-02	5	5	1.43E-01	± 6.53E-02		
	Plutonium-239/240	1	1	8.16E-03	± 4.03E-03	5	0	2.82E-03	± 1.60E-03		
	Uranium-234	1	1	1.80E+00	± 2.35E-01	5	5	1.62E+00	± 1.53E+00		
	Uranium-235	1	1	1.24E-01	± 5.14E-02	5	5	1.33E-01	± 1.45E-01		
	Uranium-238	1	1	1.53E+00	± 2.07E-01	5	5	1.55E+00	± 1.40E+00		
Hanford Slough	Cesium-137	1	1	2.26E-01	± 3.45E-02	5	5	2.45E-01	± 5.55E-02		
	Plutonium-239/240 <sup>b</sup>	1	0	2.83E-03	± 2.22E-03	5	2	4.11E-03	± 9.75E-03		

**Table C-11. Radionuclide Concentrations in Columbia River and Shoreline Sediment (Near Hanford Site) (2015-2020). (2 Pages)**

Sediment Location	Radionuclide	2020					2015-2019				
		No. of Samples	No. of Detects	Maximum Concentration <sup>a</sup> pCi/g		No. of Samples	No. of Detects	Average Concentration <sup>a</sup> pCi/g			
McNary Dam	Uranium-234	1	1	5.75E-01	±	8.94E-02	5	5	6.78E-01	±	1.29E-01
	Uranium-235 <sup>b</sup>	1	1	2.48E-02	±	2.81E-02	5	5	8.16E-02	±	3.48E-02
	Uranium-238	1	1	6.59E-01	±	9.46E-02	5	5	7.42E-01	±	1.21E-01
	Cesium-137	2	2	1.63E-01	±	5.19E-02	10	10	2.05E-01	±	5.67E-02
	Plutonium-239/240	2	1	2.49E-02	±	9.11E-03	10	5	7.12E-03	±	1.02E-02
	Uranium-234	2	2	1.60E+00	±	1.86E-01	10	10	1.49E+00	±	2.79E-01
	Uranium-235	2	2	8.69E-02	±	3.48E-02	10	9	1.01E-01	±	8.78E-02
	Uranium-238	2	2	1.32E+00	±	1.58E-01	10	10	1.20E+00	±	2.12E-01
Priest Rapids Dam	Cesium-137	2	2	2.11E-01	±	3.78E-02	10	10	2.42E-01	±	6.27E-02
	Plutonium-239/240	2	2	8.43E-02	±	1.72E-02	10	7	9.79E-03	±	5.42E-03
	Uranium-234	2	2	1.31E+00	±	1.83E-01	10	10	1.30E+00	±	3.02E-01
	Uranium-235	2	2	6.19E-02	±	3.61E-02	10	10	1.04E-01	±	3.37E-02
	Uranium-238	2	2	1.31E+00	±	1.86E-01	10	10	1.15E+00	±	2.64E-01
White Bluffs Slough	Cesium-137	1	1	-2.74E-01	±	4.81E-02	5	5	2.53E-01	±	1.12E-01
	Plutonium-239/240	1	1	4.93E-03	±	2.82E-03	5	1	3.52E-03	±	5.02E-03
	Uranium-234	1	1	1.05E+00	±	1.67E-01	5	5	9.75E-01	±	2.89E-01
	Uranium-235	1	1	7.39E-02	±	4.48E-02	5	5	1.10E-01	±	3.73E-02
	Uranium-238	1	1	1.06E+00	±	1.64E-01	5	5	8.90E-01	±	2.23E-01

<sup>a</sup>Maximum Concentrations ± Analytical Uncertainty; Average Concentrations ± 2stdv.

<sup>b</sup>Maximum value reported as a non-detect.

**Table C-12. Radionuclide Concentrations in Columbia River Shoreline Seep Water. (3 Pages)**

Location/Radionuclide	2020			2015-2019						Washington State Ambient Surface Water Quality Standard pCi/L <sup>(a, b)</sup>
	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Maximum <sup>(c)</sup>	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Average <sup>(d)</sup>				
<b>100B Area (100B Spring 38-3 and 100B Spring 39-2)</b>										
Strontium-90	2	1	3.2E-01 ± 6.9E-02	10	5	6.2E-01 ± 2.5E+00		8		
Tritium	2	2	6.0E+02 ± 1.7E+02	10	5	9.5E+02 ± 1.3E+03		20,000		
<b>100D Area (Spring 110-1)</b>										
Alpha (gross) <sup>e</sup>	1	0	4.7E-01 ± 1.6E+00	6	0	1.8E+00 ± 2.4E+00		15		
Beta (gross)	1	1	6.1E+00 ± 2.6E+00	6	5	5.5E+00 ± 8.3E+00		50		
Strontium-90	1	1	7.7E-01 ± 1.5E-01	6	5	1.2E+00 ± 1.8E+00		8		
Technetium-99 <sup>e</sup>	1	0	4.7E-01 ± 4.3E-01	6	0	-5.8E-01 ± 3.4E+00		900		
Tritium	1	1	1.0E+03 ± 3.1E+02	6	6	1.6E+03 ± 1.8E+03		20,000		

**Table C-12. Radionuclide Concentrations in Columbia River Shoreline Seep Water. (3 Pages)**

Location/Radionuclide	2020			2015-2019			Washington State Ambient Surface Water Quality Standard pCi/L <sup>(a, b)</sup>
	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Maximum <sup>(c)</sup>	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Average <sup>(d)</sup>	
Uranium-234	1	1	5.7E-01 ± 1.1E-01	6	6	8.1E-01 ± 7.4E-01	–
Uranium-235 <sup>e</sup>	1	0	4.5E-02 ± 4.1E-02	6	4	6.0E-02 ± 5.9E-02	–
Uranium-238	1	1	4.6E-01 ± 9.9E-02	6	6	7.4E-01 ± 8.3E-01	–
<b>100F Area (100F Spring 207-1 and 100F Spring 211-1)</b>							
Strontium-90	2	1	6.3E-02 ± 3.8E-02	13	0	-8.2E-02 ± 5.9E-01	8
Tritium <sup>e</sup>	2	0	1.6E+02 ± 2.2E+02	13	8	2.6E+02 ± 3.1E+02	900
<b>100H Area (Spring 152-2)</b>							
Alpha (gross)	1	1	3.8E+00 ± 2.1E+00	3	0	1.2E+00 ± 2.4E+00	15
Beta (gross) <sup>e</sup>	1	0	2.3E+00 ± 2.2E+00	3	3	6.8E+00 ± 5.9E+00	50
Strontium-90	1	1	1.0E-01 ± 4.1E-02	3	3	1.7E+00 ± 3.4E+00	8
Technetium-99 <sup>e</sup>	1	0	3.5E-02 ± 5.9E-01	3	1	1.0E+00 ± 1.3E+00	900
Tritium <sup>e</sup>	1	0	3.4E+00 ± 1.1E+02	4	0	8.1E+01 ± 1.7E+02	20,000
<b>100K Area (Spring 63-1)</b>							
Alpha (gross) <sup>e</sup>	1	0	6.1E-01 ± 1.2E+00	5	0	8.2E-01 ± 1.7E+00	15
Beta (gross)	1	1	6.9E+00 ± 2.5E+00	5	5	5.2E+00 ± 3.2E+00	50
Carbon-14	1	1	3.8E+02 ± 7.3E+01	12	10	1.3E+02 ± 2.1E+02	2,000
Strontium-90 <sup>e</sup>	1	0	4.6E-02 ± 3.6E-02	5	0	-1.7E-01 ± 6.9E-01	8
Technetium-99	1	1	1.5E+01 ± 1.8E+00	5	4	4.1E+00 ± 6.0E+00	–
Tritium	1	1	5.0E+02 ± 1.6E+02	5	0	8.4E+01 ± 1.4E+02	20,000
<b>100N Area (Spring 8-13)</b>							
Alpha (gross)		N/A	N/A	5	0	5.4E-01 ± 1.7E+00	15
Beta (gross)		N/A	N/A	5	4	3.1E+00 ± 2.4E+00	50
Strontium-90 <sup>e</sup>	1	0	4.5E-02 ± 3.6E-02	5	0	-1.3E-01 ± 5.5E-01	8
Tritium	1	1	1.9E+03 ± 4.6E+02	5	5	3.9E+03 ± 2.1E+03	20,000
<b>100N Area (Spring 89-1)</b>							
Strontium-90	1	1	4.8E+01 ± 7.5E+00	5	5	4.5E+01 ± 4.7E+01	8
Tritium	1	1	6.5E+02 ± 2.3E+02	5	3	9.5E+02 ± 1.5E+03	20,000
<b>Hanford Townsite (Hanford Spring 25-4)</b>							
Alpha (gross) <sup>e</sup>	2	0	1.8E+00 ± 1.4E+00	4	1	1.5E+00 ± 3.1E+00	15
Beta (gross)	2	1	4.0E+00 ± 2.2E+00	4	1	2.5E+00 ± 5.1E+00	50
Iodine <sup>e</sup>	2	0	1.1E-01 ± 2.8E-01	1	0	1.8E-01 ± 5.7E-01	–
Strontium-90 <sup>e</sup>	2	0	-1.4E-02 ± 3.1E-02	4	0	-4.0E-02 ± 2.1E-01	8
Technetium-99 <sup>e</sup>	2	0	7.2E-01 ± 4.6E-01	4	0	2.4E-01 ± 8.2E-01	–
Tritium <sup>e</sup>	2	0	4.5E+01 ± 1.4E+02	4	0	1.3E+01 ± 2.3E+02	20000
<b>Hanford Townsite (Hanford Spring 28-2)</b>							
Alpha (gross)	1	1	2.9E+00 ± 1.9E+00	5	2	2.9E+00 ± 4.5E+00	15
Beta (gross)	1	1	3.0E+01 ± 4.0E+00	5	5	3.2E+01 ± 2.5E+01	50

**Table C-12. Radionuclide Concentrations in Columbia River Shoreline Seep Water. (3 Pages)**

Location/Radionuclide	2020			2015-2019						Washington State Ambient Surface Water Quality Standard pCi/L <sup>(a, b)</sup>
	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Maximum <sup>(c)</sup>	No. of Samples	No. of Detects	Concentration pCi/L <sup>(a)</sup> Average <sup>(d)</sup>				
Iodine <sup>e</sup>	1	0	2.8E-01 ± 3.8E-01	5	0	3.8E-02 ± 4.6E-01			–	
Tritium	1	1	1.8E+04 ± 3.4E+03	5	5	1.8E+04 ± 1.3E+04			20,000	
<b>300 Area (300 Area Spring 42-2 and 300 Area Spring DR 42-2)<sup>f</sup></b>										
Alpha (gross)	1	1	5.6E+00 ± 2.5E+00	12	12	2.4E+01 ± 2.4E+01			15	
Beta (gross)	1	1	3.3E+00 ± 2.0E+00	12	12	1.7E+01 ± 1.6E+01			50	
Tritium	1	1	1.1E+03 ± 3.8E+02	12	12	3.2E+03 ± 2.4E+03			20,000	
Uranium-234	1	1	3.0E+00 ± 3.2E-01	12	12	1.6E+01 ± 1.9E+01			–	
Uranium-235	1	1	1.5E-01 ± 4.3E-02	12	12	1.3E+00 ± 1.8E+00			–	
Uranium-236	1	1	7.7E-02 ± 3.3E-02	7	2	2.3E-01 ± 2.7E-01			–	
Uranium-238	1	1	2.7E+00 ± 3.0E-01	12	12	1.5E+01 ± 1.9E+01			–	

<sup>a</sup> 1 pCi = 0.037 Bq.

<sup>b</sup> WAC 246-290, 40 CFR 141; WAC 173-201A-250; EPA-570/9-76-003; Appendix Table D.4

<sup>c</sup> Maximum values are ± total propagated analytical uncertainty.

<sup>d</sup> Averages are ± 2 standard deviations of the mean.

<sup>e</sup> Maximum value reported for 2019 is a non-detect.

<sup>f</sup> 300 Area Spring 42-2 was the only sample collected from the 300 Area in 2020.

N/A = Not Applicable (Samples not analyzed for contaminant).

Note: Dashes indicate no concentration guides available.

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)
100B (39-2 and 38-3)	<b>Metals</b>						
	Antimony	2	0	Filtered	1.00E+00	µg/L	12
		2	0	Unfiltered			
	Arsenic	2	1	Filtered	2.00E+00 - 2.24E+00	µg/L	10
		2	1	Unfiltered	2.00E+00 - 2.36E+00		
	Cadmium	2	0	Filtered	3.00E-01	µg/L	0.59
		2	0	Unfiltered			
	Chromium	2	2	Filtered	4.22E+00 - 5.35E+00	µg/L	10 <sup>d</sup>
		2	2	Unfiltered	4.36E+00 - 5.17E+00		
	Copper	2	1	Filtered	3.00E-01 - 8.27E-01	µg/L	1300
		2	2	Unfiltered	3.94E-01 - 9.33E-01		
	Lead	2	0	Filtered	5.00E-01	µg/L	1.1
		2	0	Unfiltered			
	Nickel	2	1	Filtered	6.00E-01 - 7.61E-01	µg/L	150
		2	2	Unfiltered	6.00E-01 - 6.86E-01		
	Selenium	2	0	Filtered	2.00E+00	µg/L	120
		2	0	Unfiltered			
	Thallium	2	0	Filtered	6.00E-01	µg/L	0.24
		2	0	Unfiltered			
	Zinc	2	2	Filtered	7.91E+00 - 9.12E+00	µg/L	2,300
2		2	Unfiltered	5.98E+00 - 7.32E+00			
<b>Anions</b>							
	Nitrate	2	2	Unfiltered	4.91E+03 - 5.80E+03	µg/L	10 <sup>f</sup>
100D (110-1)	<b>Metals</b>						
	Antimony	1	0	Filtered	1.00E+00	µg/L	12
		1	0	Unfiltered			

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)	
	Arsenic	1	0	Filtered	2.00E+00	µg/L	10	
		1	0	Unfiltered				
	Cadmium	1	0	Filtered	3.00E-01	µg/L	0.59	
		1	0	Unfiltered				
	Chromium	1	1	Filtered	6.23E+00	µg/L	10 <sup>d</sup>	
		1	1	Unfiltered	6.79E+00		96 <sup>e</sup>	
	Copper	1	1	Filtered	9.49E-01	µg/L	1300	
		1	1	Unfiltered	3.89E-01			
	Lead	1	0	Filtered	5.00E-01	µg/L	1.1	
		1	0	Unfiltered				
	Nickel	1	0	Filtered	6.00E-01	µg/L	150	
		1	1	Unfiltered	6.35E-01			
	Selenium	1	0	Filtered	2.00E+00	µg/L	120	
		1	0	Unfiltered				
	Thallium	1	0	Filtered	6.00E-01	µg/L	0.24	
		1	0	Unfiltered				
	Zinc	1	1	Filtered	1.01E+01	µg/L	2,300	
		1	1	Unfiltered	1.06E+01			
	<b>Anions</b>							
	Nitrate	1	1	Unfiltered	9.87E+03	µg/L	10 <sup>f</sup>	
100F (207-1 and 211-1)	<b>Metals</b>							
	Antimony	2	0	Filtered	1.00E+00	µg/L	12	
		2	0	Unfiltered				
	Arsenic	2	0	Filtered	2.00E+00	µg/L	10	
		2	1	Unfiltered	2.00E+00 - 2.36E+00			
	Cadmium	2	0	Filtered	3.00E-01	µg/L	0.59	

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)
	Chromium	2	0	Unfiltered			
		2	0	Filtered	3.00E+00	µg/L	10 <sup>d</sup>
	Copper	2	1	Unfiltered	3.00E+00 - 5.36E+00	µg/L	96 <sup>e</sup>
		2	2	Filtered	7.02E-01 - 8.81E-01		
	Lead	2	2	Unfiltered	9.61E-01 - 4.20E+00	µg/L	1300
		2	0	Filtered	5.00E-01		
	Nickel	2	2	Unfiltered	5.05E-01 - 5.61E+00	µg/L	1.1
		2	1	Filtered	6.00E-01 - 7.03E-01		
	Selenium	2	2	Unfiltered	6.37E-01 - 1.86E+00	µg/L	150
		2	0	Filtered	2.00E+00		
	Thallium	2	0	Filtered	6.00E-01	µg/L	120
		2	0	Unfiltered			
	Zinc	2	2	Filtered	4.76E+00 - 6.05E+00	µg/L	2,300
		2	2	Unfiltered	8.23E+00 - 3.68E+01		
<b>Anions</b>							
	Nitrate	2	2	Unfiltered	7.17E+03 - 8.77E+03	µg/L	10 <sup>f</sup>
<b>Metals</b>							
100H (152-2)	Antimony	1	0	Filtered	1.00E+00	µg/L	12
		1	0	Unfiltered			
	Arsenic	1	0	Filtered	2.00E+00	µg/L	10
		1	0	Unfiltered			
	Cadmium	1	0	Filtered	3.00E-01	µg/L	0.59
		1	0	Unfiltered			
	Chromium	1	0	Filtered	3.00E+00	µg/L	10 <sup>d</sup>
		1	1	Unfiltered	3.08E+00		

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)	
100K (63-1)	Copper	1	1	Filtered	9.03E-01	µg/L	1300	
		1	1	Unfiltered	1.17E+00			
	Lead	1	0	Filtered	5.00E-01	µg/L	1.1	
		1	1	Unfiltered	1.27E+00			
	Nickel	1	0	Filtered	6.00E-01	µg/L	150	
		1	0	Unfiltered				
	Selenium	1	0	Filtered	2.00E+00	µg/L	120	
		1	0	Unfiltered				
	Thallium	1	0	Filtered	6.00E-01	µg/L	0.24	
		1	0	Unfiltered				
	Zinc	1	1	Filtered	9.22E+00	µg/L	2,300	
		1	1	Unfiltered	9.60E+00			
	<b>Anions</b>							
		Nitrate	1	1	Unfiltered	1.40E+03	µg/L	10 <sup>f</sup>
<b>Metals</b>								
	Antimony	1	0	Filtered	1.00E+00	µg/L	12	
		1	0	Unfiltered				
	Arsenic	1	1	Filtered	2.06E+00	µg/L	10	
		1	0	Unfiltered	2.00E+00			
	Cadmium	1	0	Filtered	3.00E-01	µg/L	0.59	
		1	0	Unfiltered				
	Chromium	1	1	Filtered	4.63E+00	µg/L	10 <sup>d</sup>	
		1	1	Unfiltered	7.05E+00		96 <sup>e</sup>	
	Copper	1	1	Filtered	5.17E-01	µg/L	1300	
		1	1	Unfiltered	2.06E+00			
	Lead	1	0	Filtered	5.00E-01	µg/L	1.1	

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)	
	Nickel	1	0	Unfiltered				
		1	1	Filtered	6.79E-01	µg/L	150	
	Selenium	1	1	Unfiltered	1.09E+00			
		1	0	Filtered	2.00E+00	µg/L	120	
		1	0	Unfiltered				
		1	0	Filtered	6.00E-01	µg/L	0.24	
	Zinc	1	1	Filtered	8.79E+00	µg/L	2,300	
		1	1	Unfiltered	1.07E+01			
	<b>Anions</b>							
		Nitrate	1	1	Unfiltered	1.14E+04	µg/L	10 <sup>f</sup>
<b>Metals</b>								
100N (8-13 and 89-1 <sup>g</sup> )	Antimony	2	0	Filtered	1.00E+00	µg/L	12	
		2	0	Unfiltered				
	Arsenic	2	2	Filtered	3.14E+00 - 4.20E+00	µg/L	10	
		2	2	Unfiltered	3.26E+00 - 4.37E+00			
	Cadmium	2	0	Filtered	3.00E-01	µg/L	0.59	
		2	0	Unfiltered				
	Chromium	2	1	Filtered	3.00E+00 - 5.04E+00	µg/L	10 <sup>d</sup>	
		2	1	Unfiltered	3.00E+00 - 4.87E+00		96 <sup>e</sup>	
	Copper	2	2	Filtered	3.26E-01 - 4.43E-01	µg/L	1300	
		2	2	Unfiltered	3.24E-01 - 4.30E+00			
	Lead	2	0	Filtered	5.00E-01	µg/L	1.1	
		2	1	Unfiltered	5.00E-01 - 1.06E+00			
	Nickel	2	1	Filtered	6.00E-01 - 2.08E+00	µg/L	150	
		2	1	Unfiltered	6.00E-01 - 4.28E+00			

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>			Unit	Regulatory limit <sup>c</sup> (µg/L)		
	Selenium	2	0	Filtered	2.00E+00			µg/L	120		
		2	0	Unfiltered							
	Thallium	2	0	Filtered	6.00E-01			µg/L	0.24		
		2	0	Unfiltered							
	Zinc	2	2	Filtered	8.22E+00	-	1.48E+01	µg/L	2,300		
		2	2	Unfiltered	7.45E+00	-	3.06E+01				
	<b>Anions</b>										
		Nitrate	2	2	Unfiltered	1.45E+04	-	1.81E+04	µg/L	10 <sup>f</sup>	
	Hanford Townsite (25-4)	<b>Metals</b>									
		Antimony	2	0	Filtered	1.00E+00			µg/L	12	
2			0	Unfiltered							
Arsenic		2	0	Filtered	2.00E+00			µg/L	10		
		2	1	Unfiltered	2.00E+00	-	2.10E+00				
Cadmium		2	0	Filtered	3.00E-01			µg/L	0.59		
		2	0	Unfiltered							
Chromium		2	0	Filtered	3.00E+00			µg/L	10 <sup>d</sup>		
		2	0	Unfiltered					96 <sup>e</sup>		
Copper		2	2	Filtered	4.92E-01	-	2.86E+00	µg/L	1300		
		2	2	Unfiltered	3.40E-01	-	3.70E-01				
Lead		2	0	Filtered	5.00E-01			µg/L	1.1		
		2	0	Unfiltered							
Nickel		2	0	Filtered	6.00E-01			µg/L	150		
		2	0	Unfiltered							
Selenium		2	0	Filtered	2.00E+00			µg/L	120		
	2	0	Unfiltered								
	Thallium	2	0	Filtered	6.00E-01			µg/L	0.24		

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>			Unit	Regulatory limit <sup>c</sup> (µg/L)
	Zinc	2	0	Unfiltered				µg/L	2,300
		2	2	Filtered	8.49E+00	-	9.26E+00		
		2	2	Unfiltered	5.78E+00	-	7.91E+00		
<b>Anions</b>									
	Nitrate	2	2	Unfiltered	1.74E+03	-	1.76E+03	µg/L	10 <sup>f</sup>
<b>Metals</b>									
Hanford Spring (28-2)	Antimony	1	0	Filtered	1.00E+00			µg/L	12
		1	0	Unfiltered					
	Arsenic	1	1	Filtered	4.16E+00			µg/L	10
		1	1	Unfiltered					
	Cadmium	1	0	Filtered	3.00E-01			µg/L	0.59
		1	0	Unfiltered					
	Chromium	1	0	Filtered	3.00E+00			µg/L	10 <sup>d</sup>
		1	0	Unfiltered					96 <sup>e</sup>
	Copper	1	1	Filtered	1.34E+00			µg/L	1300
		1	1	Unfiltered					
	Lead	1	1	Filtered	1.17E+00			µg/L	1.1
		1	0	Unfiltered					
	Nickel	1	1	Filtered	1.14E+00			µg/L	150
		1	0	Unfiltered					
	Selenium	1	0	Filtered	2.00E+00			µg/L	120
		1	0	Unfiltered					
	Thallium	1	0	Filtered	6.00E-01			µg/L	0.24
		1	0	Unfiltered					
Zinc	1	1	Filtered	1.34E+01			µg/L	2,300	
	1	1	Unfiltered						5.11E+00

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

Location	Analyte	# of samples	Detects	Filtered/ Unfiltered <sup>a</sup>	Range (min-max) <sup>b</sup>	Unit	Regulatory limit <sup>c</sup> (µg/L)
300 Area (Spring 42-2)	<b>Anions</b>						
	Nitrate	1	1	Unfiltered	1.78E+04	µg/L	10 <sup>f</sup>
	<b>Metals</b>						
	Antimony	1	0	Filtered	1.00E+00	µg/L	12
		1	0	Unfiltered			
	Arsenic	1	0	Filtered	2.00E+00	µg/L	10
		1	1	Unfiltered	2.08E+00		
	Cadmium	1	0	Filtered	3.00E-01	µg/L	0.59
		1	0	Unfiltered			
	Chromium	1	0	Filtered	3.00E+00	µg/L	10 <sup>d</sup>
		1	0	Unfiltered			96 <sup>e</sup>
	Copper	1	1	Filtered	9.41E-01	µg/L	1300
		1	1	Unfiltered	1.90E+00		
	Lead	1	0	Filtered	5.00E-01	µg/L	1.1
		1	1	Unfiltered	1.44E+01		
	Nickel	1	0	Filtered	6.00E-01	µg/L	150
		1	1	Unfiltered	1.41E+00		
	Selenium	1	0	Filtered	2.00E+00	µg/L	120
		1	0	Unfiltered			
	Thallium	1	0	Filtered	6.00E-01	µg/L	0.24
		1	0	Unfiltered			
Zinc	1	1	Filtered	1.05E+01	µg/L	2,300	
	1	1	Unfiltered	1.92E+01			
<b>Anions</b>							
Nitrate	1	1	Unfiltered	6.02E+03	µg/L	10 <sup>f</sup>	

**Table C-13. Metal and Anion Concentrations in Columbia River Shoreline Seeps. (9 Pages)**

<b>Location</b>	<b>Analyte</b>	<b># of samples</b>	<b>Detects</b>	<b>Filtered/ Unfiltered<sup>a</sup></b>	<b>Range (min-max)<sup>b</sup></b>	<b>Unit</b>	<b>Regulatory limit<sup>c</sup> (µg/L)</b>
<sup>a</sup> Dissolved concentrations are associated with filtered samples; Recoverable concentrations are associated with unfiltered samples. <sup>b</sup> For non-detects, one value is shown for the method detection limit; Multiple values are shown on non-detects if the laboratory method detection limit differed during the analyses process. <sup>c</sup> Ambient water quality criteria values or chronic toxicity unless otherwise noted (WAC 173-201A-240). <sup>d</sup> Value for hexavalent chromium. <sup>e</sup> Value for trivalent chromium. <sup>f</sup> Washington State drinking water standard utilized (WAC 246-290).							

**Table C-14. Metal Concentration Ranges in Columbia River Sediment (Near Hanford Site).**

Metal	Priest Rapids Dam	Hanford Reach <sup>a</sup>	McNary Dam
	(mg/kg dry weight)	(mg/kg dry weight)	(mg/kg dry weight)
Antimony	0.73 - 0.98	0.42 - 2.8	0.71 - 0.83
Arsenic	6.7 - 10.1	1.53 - 14.3	4.81 - 7.85
Beryllium	0.22 - 0.30	0.12 - 1.2	0.21 - 0.25
Cadmium	4.2 - 6.2	0.15 - 2.8	1.2 - 1.9
Chromium	32.7 - 47.9	14.7 - 40.5	29 - 29.1
Copper	39.5 - 61.1	9.7 - 30.3	23.3 - 33.4
Lead	35.4 - 43.2	7.41 - 74.0	17.4 - 20.0
Mercury	0.125 - 0.128	0.009 - 0.055	0.0541 - 0.0544
Nickel	35.2 - 49.5	8.3 - 18.4	22.8 - 27.2
Selenium	1.1 - 1.49	0.52 - 4.2	1.07 - 1.25
Silver	0.22 - 0.30	0.11 - 0.16	0.21 - 0.25
Thallium	1.1 - 1.5	0.58 - 2.7	1.1 - 1.3
Zinc	378 - 510	54.6 - 398	199
<b>No. of Samples</b>	<b>2</b>	<b>10</b>	<b>2</b>

<sup>a</sup> 100-F Slough (n=1), Hanford Slough (n=1), White Bluffs Slough (n=1), Adjacent to Locke Island (n=1), Adjacent to Savage Island (n=1), 100-H 145-1 (n=1), 100-D Spring 102-1 (n=2), 100-K 63-1 (n=1), 300 Area (n=1); where n = number of samples.

**Table C-15. Columbia River Hexavalent Chromium in Sediment Samples. (2 Pages)**

Location	No. of Samples	No. of Detects	2020 Max Concentration (ug/Kg)	No. of Samples	No. of Detects	2015-2019 Max Concentration (ug/Kg)
300 Area Spring DR 42-2 <sup>a</sup> (shoreline)	1	1	2310	5	1	4420
Adjacent to Savage Island (shoreline)	1	0	242	5	2	772
Hanford Slough	1	0	214	5	2	408
White Bluffs Slough	1	0	243	5	1	409

**Table C-15. Columbia River Hexavalent Chromium in Sediment Samples.  
(2 Pages)**

Location	No. of Samples	No. of Detects	2020 Max Concentration (ug/Kg)		No. of Detects	2015-2019 Max Concentration (ug/Kg)	
			Minimum	Maximum		Minimum	Maximum
100F Slough	1	0	201	201	6	2	461
100H Spring 145-1 (shoreline)	1	0	227	227	5	1	611
Adjacent to Locke Island (shoreline)	1	0	238	238	6	1	622
100D 102-1 <sup>a</sup>	2	2	708	708	10	8	5850
100K Spring 63-1 <sup>a</sup> (shoreline)	1	1	510	510	6	3	2430
Priest Rapids Dam (Grant Side)	1	0	456	456	5	2	2670
Priest Rapids Dam (Yakima Side)	1	0	332	332	5	1	2870
McNary Dam (WA Side)	1	0	342	342	5	2	125000
McNary Dam (OR Side)	1	0	437	437	5	2	88200

<sup>a</sup> Exceeded hold time by 3 days; however, results are still considered useable.

**Table C-16. Total Organic Carbon in Columbia River Sediment (2015-2020).  
(2 Pages)**

Sediment Location	No. of Samples	2020 Concentration <sup>a</sup>		No. of Samples	2015-2019 Concentration <sup>a</sup>	
		Minimum mg/kg	Maximum mg/kg		Minimum mg/kg	Maximum mg/kg
Adjacent to Locke Island <sup>b,c</sup>	0	N/A	N/A	1	1.17E+03	
Adjacent to Savage Island <sup>b,c</sup>	0	N/A	N/A	1	2.24E+03	
100-D Spring 102-1	2	1.74E+03	2.10E+03	10	1.88E+03	5.61E+03

**Table C-16. Total Organic Carbon in Columbia River Sediment (2015-2020).  
(2 Pages)**

Sediment Location	No. of Samples	2020 Concentration <sup>a</sup>		No. of Samples	2015-2019 Concentration <sup>a</sup>	
		Minimum mg/kg	Maximum mg/kg		Minimum mg/kg	Maximum mg/kg
100-F Slough <sup>c</sup>	1	2.71E+03		6	1.50E+03	8.05E+03
100-H Spring 145-1 <sup>c</sup>	1	3.09E+04		5	7.25E+03	1.59E+04
100-K Spring 63-1 <sup>c</sup>	1	5.55E+03		6	1.40E+03	1.81E+04
300 Area DR 42-2 <sup>c</sup>	1	6.84E+04		5	1.72E+03	7.78E+03
Hanford Slough <sup>c</sup>	1	6.13E+03		5	7.19E+03	1.48E+04
McNary Dam	2	1.67E+04	2.73E+04	10	1.25E+04	2.52E+04
Priest Rapids Dam	2	2.90E+04	3.68E+04	10	1.51E+04	3.71E+04
White Bluffs Slough <sup>c</sup>	1	1.40E+04		5	8.35E+03	1.68E+04

**Table C-17. Horn Rapids Irrigation Water Sample Results.**

Radionuclide	2020							2015-2019						
	Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)			Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)		
	Samples	Detects						Samples	Detects					
Antimony-125	3	0	6.4E-01	± 2.9E+00	2.5E+00	± 6.9E+00		18	0	-1.6E-01	± 3.6E+00	2.2E+00	± 4.8E+00	
Cesium-134 <sup>c</sup>	3	0	3.7E-01	± 2.0E+00	1.5E+00	± 2.6E+00		18	0	-7.6E-02	± 2.1E+00	2.3E+00	± 2.8E+00	
Cesium-137 <sup>c</sup>	3	0	1.3E-01	± 3.3E+00	2.3E+00	± 3.1E+00		18	0	4.6E-01	± 1.4E+00	2.2E+00	± 1.8E+00	
Cobalt-60 <sup>c</sup>	3	0	3.2E-01	± 1.4E+00	1.1E+00	± 2.0E+00		18	0	1.4E-02	± 1.9E+00	2.4E+00	± 2.1E+00	
Europium-152 <sup>c</sup>	3	0	-9.0E-01	± 1.9E+00	-1.6E-01	± 8.3E+00		18	0	-2.4E-01	± 4.9E+00	5.1E+00	± 6.9E+00	
Europium-154 <sup>c</sup>	3	0	5.7E-01	± 2.5E+00	2.3E+00	± 6.2E+00		18	0	-8.4E-01	± 6.8E+00	3.1E+00	± 4.1E+00	
Europium-155 <sup>c</sup>	3	0	3.4E+00	± 7.2E+00	8.2E+00	± 1.0E+01		18	0	2.3E+00	± 6.7E+00	7.6E+00	± 7.7E+00	
Ruthenium-106 <sup>c</sup>	3	0	1.0E+01	± 7.5E+00	1.6E+01	± 2.5E+01		18	0	-1.5E+00	± 2.2E+01	2.0E+01	± 2.0E+01	
Strontium-90 <sup>c</sup>	3	0	7.5E-03	± 2.0E-02	1.9E-02	± 3.5E-02		18	0	1.4E-02	± 3.8E-02	4.8E-02	± 3.7E-02	
Tritium	3	3	3.2E+01	± 2.6E+01	5.0E+01	± 1.6E+01		18	18	2.1E+01	± 1.5E+01	3.9E+01	± 1.3E+01	

<sup>a</sup> Averages are ±2 standard deviations.  
<sup>b</sup> Maximum values are ± analytical uncertainty.  
<sup>c</sup> Results include concentrations below detection limit.

**Table C-18. Riverview Irrigation Water Sample Results**

Radionuclide	2020							2015-2019						
	Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)			Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)		
	Samples	Detects						Samples	Detects					
Antimony-125	3	0	-6.3E-01	± 6.4E+00	3.8E+00	± 5.4E+00		17	0	7.3E-01	± 5.1E+00	6.0E+00	± 5.8E+00	
Cesium-134 <sup>c</sup>	3	0	1.4E+00	± 4.0E+00	4.1E+00	± 3.2E+00		17	0	-4.0E-02	± 2.1E+00	2.2E+00	± 2.2E+00	
Cesium-137 <sup>c</sup>	3	0	-8.7E-02	± 9.0E-01	5.0E-01	± 1.8E+00		17	0	-1.0E-01	± 2.1E+00	1.9E+00	± 2.4E+00	
Cobalt-60 <sup>c</sup>	3	0	-3.5E-01	± 2.0E+00	1.0E+00	± 2.3E+00		17	0	7.2E-01	± 1.9E+00	3.9E+00	± 3.2E+00	
Europium-152 <sup>c</sup>	3	0	1.8E-01	± 1.1E+00	7.1E-01	± 4.8E+00		17	0	-6.9E-01	± 6.1E+00	3.8E+00	± 5.0E+00	
Europium-154 <sup>c</sup>	3	0	1.9E+00	± 4.7E+00	4.1E+00	± 5.4E+00		17	0	-2.1E-01	± 5.8E+00	6.5E+00	± 6.7E+00	
Europium-155 <sup>c</sup>	3	0	-2.3E+00	± 6.1E-01	-2.1E+00	± 7.3E+00		17	0	1.9E+00	± 5.6E+00	8.1E+00	± 8.0E+00	
Ruthenium-106 <sup>c</sup>	3	0	4.0E+00	± 1.1E+01	1.2E+01	± 1.6E+01		17	0	-1.9E+00	± 1.8E+01	1.7E+01	± 1.9E+01	
Strontium-90 <sup>c</sup>	3	0	8.8E-03	± 3.0E-02	2.6E-02	± 2.6E-02		17	0	6.4E-03	± 4.1E-02	2.9E-02	± 3.5E-02	
Tritium	3	3	1.7E+01	± 3.6E+00	1.8E+01	± 6.9E+00		17	16	2.8E+01	± 1.0E+02	2.3E+02	± 1.3E+02	

<sup>a</sup> Averages are ±2 standard deviations.  
<sup>b</sup> Maximum values are ± analytical uncertainty.  
<sup>c</sup> Results include concentrations below detection limit.

**Table C-19. Sagemoor Irrigation Water Sample Results**

Radionuclide	2020							2015-2019						
	Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)			Number of		Average <sup>a</sup> (pCi/L)		Maximum <sup>b</sup> (pCi/L)		
	Samples	Detects						Samples	Detects					
Antimony-125	3	0	-2.7E-02	± 2.9E+00	1.3E+00	± 5.0E+00		6	0	-2.6E-01	± 3.1E+00	1.1E+00	± 3.8E+00	
Cesium-134 <sup>c</sup>	3	0	4.0E-01	± 1.4E+00	1.3E+00	± 1.9E+00		6	0	3.5E-01	± 3.5E+00	4.1E+00	± 2.7E+00	
Cesium-137 <sup>c</sup>	3	0	7.4E-01	± 1.3E+00	1.6E+00	± 1.8E+00		6	0	5.1E-01	± 7.7E-01	8.7E-01	± 1.6E+00	
Cobalt-60 <sup>c</sup>	3	0	-4.4E-01	± 2.7E+00	1.1E+00	± 2.3E+00		6	0	-6.9E-02	± 1.4E+00	5.5E-01	± 1.6E+00	
Europium-152 <sup>c</sup>	3	0	-9.5E-01	± 4.2E+00	2.0E+00	± 5.7E+00		6	0	6.8E-01	± 4.4E+00	3.5E+00	± 5.1E+00	
Europium-154 <sup>c</sup>	3	0	2.4E+00	± 6.6E+00	7.0E+00	± 5.0E+00		6	0	1.5E+00	± 4.2E+00	5.2E+00	± 3.8E+00	
Europium-155 <sup>c</sup>	3	0	-1.6E+00	± 3.3E+00	4.2E-01	± 8.0E+00		6	0	5.6E-01	± 9.8E+00	9.2E+00	± 8.6E+00	
Ruthenium-106 <sup>c</sup>	3	0	7.8E+00	± 9.8E+00	1.5E+01	± 2.2E+01		6	0	5.0E-01	± 1.2E+01	8.0E+00	± 1.7E+01	
Strontium-90 <sup>c</sup>	3	0	2.9E-02	± 2.5E-02	4.1E-02	± 3.1E-02		6	0	8.3E-03	± 3.4E-02	3.1E-02	± 2.7E-02	
Tritium	3	3	1.6E+01	± 3.3E+00	1.8E+01	± 6.5E+00		6	6	1.5E+01	± 4.8E+00	1.9E+01	± 6.9E+00	

<sup>a</sup> Averages are ±2 standard deviations.

<sup>b</sup> Maximum values are ± analytical uncertainty.

<sup>c</sup> Results include concentrations below detection limit.

## C.6 Vegetation Monitoring

Table C-20. Concentrations of Select Radionuclides (pCi/g)<sup>a</sup> in Hanford Site Vegetation Samples. (2 Pages)

Radionuclide	Hanford Area	2020								2015 - 2019							
		Number of		Average <sup>c</sup> (pCi/g)		Maximum <sup>d</sup> (pCi/g)		Location	Number of		Average <sup>c</sup> (pCi/g)		Maximum <sup>d</sup> (pCi/g)		Location		
		Samples	Detects <sup>b</sup>						Samples	Detects <sup>b</sup>							
<sup>241</sup> Am	200-W	8	1	2.3E-03	± 5.9E-03	8.4E-03	± 5.9E-03	V034	16	4	1.2E-02	± 5.1E-02	1.1E-01	± 2.5E-02	V034		
<sup>137</sup> Cs	100	2	0	1.8E-02	± 3.4E-03	1.9E-02	± 2.6E-02	Y724	11	0	4.4E-03	± 3.7E-02	2.2E-02	± 5.9E-02	Y724		
	200-E	8	4	3.4E-02	± 6.3E-02	8.2E-02	± 3.7E-02	V058	46	7	3.9E-02	± 2.4E-01	8.0E-01	± 5.9E-02	V076		
	200-W	18	0	7.0E-03	± 2.9E-02	3.3E-02	± 2.8E-02	V044	87	7	1.7E-02	± 4.0E-02	8.6E-02	± 2.9E-02	V036		
	300	2	0	-9.6E-03	± 1.1E-02	-5.6E-03	± 2.0E-02	V132	9	0	2.0E-02	± 3.8E-02	4.4E-02	± 4.7E-02	V132		
	400	1	0	1.4E-02		1.4E-02	± 2.5E-02	V130	4	0	1.7E-02	± 8.3E-02	7.7E-02	± 5.9E-02	V130		
	600	14	2	1.5E-02	± 3.2E-02	3.5E-02	± 2.6E-02	V090	72	7	1.3E-02	± 4.8E-02	1.3E-01	± 3.5E-02	V086		
<sup>238</sup> Pu	100	2	0	-8.2E-05	± 8.2E-04	2.1E-04	± 1.3E-03	Y719	11	0	-1.3E-03	± 6.6E-03	7.9E-04	± 6.7E-04	Y724		
	200-E	8	0	-1.8E-04	± 4.6E-04	8.1E-05	± 6.7E-04	V064	46	2	1.1E-03	± 6.3E-03	1.1E-02	± 8.1E-03	V060		
	200-W	18	0	-5.1E-05	± 2.2E-03	2.8E-03	± 2.4E-03	V020	87	8	-2.0E-01	± 1.8E+00	4.5E-02	± 1.4E-02	V034		
	300	2	0	-1.0E-03	± 7.7E-04	-7.6E-04	± 1.0E-03	V132	9	0	9.2E-04	± 2.4E-03	3.1E-03	± 6.5E-03	V132		
	400	1	0	-3.2E-04		-3.2E-04	± 7.8E-04	V130	4	0	1.2E-03	± 4.9E-03	5.0E-03	± 8.0E-03	V130		
	600	14	0	-3.5E-04	± 1.3E-03	9.3E-04	± 1.1E-03	V114	72	0	-4.2E-05	± 5.5E-03	8.8E-03	± 1.2E-02	V092		
<sup>239/240</sup> Pu	100	2	0	1.3E-03	± 1.9E-03	2.0E-03	± 2.0E-03	Y724	11	1	8.4E-04	± 2.1E-03	3.0E-03	± 7.3E-03	Y724		
	200-E	8	0	-2.1E-04	± 1.2E-03	6.1E-04	± 1.3E-03	V066	46	8	8.6E-04	± 5.1E-03	9.9E-03	± 8.5E-03	V066		
	200-W	18	3	8.6E-04	± 3.1E-03	4.4E-03	± 3.1E-03	V034	87	50	-6.7E-02	± 1.5E+00	6.3E-01	± 7.8E-02	V034		
	300	2	0	-5.8E-05	± 1.3E-03	3.9E-04	± 1.2E-03	V123	9	0	2.6E-04	± 7.7E-03	8.2E-03	± 7.1E-03	V123		
	400	1	0	-8.0E-04		-8.0E-04	± 1.3E-03	V130	4	0	-1.6E-04	± 1.2E-03	3.2E-04	± 2.8E-04	V130		
	600	14	0	3.0E-04	± 1.7E-03	2.0E-03	± 1.6E-03	V108	72	11	7.3E-04	± 5.1E-03	9.7E-03	± 9.0E-03	V108		
<sup>90</sup> Sr	100	2	2	7.4E+00	± 1.6E+01	1.3E+01	± 2.4E+00	Y719	11	11	6.8E-01	± 1.3E+00	1.8E+00	± 3.4E-01	Y724		
	200-E	8	2	4.8E-02	± 1.4E-01	1.9E-01	± 5.4E-02	V066	46	17	6.4E-02	± 2.3E-01	5.1E-01	± 1.2E-01	V063		
	200-W	18	1	7.3E-03	± 4.1E-02	7.5E-02	± 4.0E-02	V020	87	6	1.4E-02	± 7.2E-02	1.7E-01	± 4.9E-02	V045		
	300	2	0	1.0E-03	± 2.0E-02	8.0E-03	± 2.7E-02	V123	9	0	-3.8E-03	± 4.1E-02	3.7E-02	± 2.5E-02	V123		
	400	1	0	-5.8E-03(3)		-5.8E-03	± 1.5E-02	V130	4	0	-1.7E-03	± 2.0E-02	7.5E-03	± 2.4E-02	V130		
	600	14	1	2.2E-02	± 6.5E-02	1.2E-01	± 2.6E-02	V104	72	1	6.7E-03	± 4.3E-02	7.3E-02	± 3.6E-02	V091		
<sup>233/234</sup> U	100	2	0	1.30E-02	± 1.50E-02	1.9E-02	± 1.3E-02	Y719	11	6	1.6E-02	± 3.0E-02	3.9E-02	± 1.3E-02	Y724		
	200-E	8	3	1.40E-02	± 8.60E-03	2.2E-02	± 1.1E-02	V078	46	35	2.8E-02	± 5.8E-02	1.2E-01	± 4.0E-02	V062		
	200-W	18	3	9.60E-03	± 1.20E-02	2.1E-02	± 1.6E-02	V022	87	52	1.6E-02	± 3.0E-02	9.5E-02	± 4.5E-02	V004		
	300	2	0	4.50E-03	± 7.80E-04	4.8E-03	± 1.1E-02	V123	9	6	1.9E-02	± 2.1E-02	3.5E-02	± 1.4E-02	V123		
	400	1	0	1.4E-02(3)		1.4E-02	± 9.9E-03	V130	4	4	1.9E-02	± 1.1E-02	2.5E-02	± 1.3E-02	V130		
	600	14	3	9.60E-03	± 1.50E-02	2.2E-02	± 1.1E-02	V092	72	47	2.4E-02	± 5.7E-02	1.4E-01	± 4.8E-02	V108		
<sup>235</sup> U	100	2	0	3.60E-03	± 1.00E-02	7.1E-03	± 7.4E-03	Y724	11	5	9.3E-03	± 1.3E-02	1.8E-02	± 1.1E-02	Y719		
	200-E	8	1	5.70E-03	± 8.10E-03	1.3E-02	± 9.2E-03	V078	46	24	1.5E-02	± 3.9E-02	8.1E-02	± 3.8E-02	V054		
	200-W	18	1	4.90E-03	± 6.90E-03	9.5E-03	± 9.9E-03	V022	87	26	7.2E-03	± 2.3E-02	6.8E-02	± 3.6E-02	V048		

**Table C-20. Concentrations of Select Radionuclides (pCi/g)<sup>a</sup> in Hanford Site Vegetation Samples. (2 Pages)**

Radionuclide	Hanford Area	2020								2015 - 2019							
		Number of		Average <sup>c</sup> (pCi/g)	Maximum <sup>d</sup> (pCi/g)			Location	Number of		Average <sup>c</sup> (pCi/g)	Maximum <sup>d</sup> (pCi/g)			Location		
		Samples	Detects <sup>b</sup>						Samples	Detects <sup>b</sup>							
<sup>238</sup> U	300	2	0	-1.30E-04 ± 3.60E-03	1.2E-03 ± 5.0E-03	V132	9	4	9.1E-03 ± 1.7E-02	2.3E-02 ± 1.2E-02	V123						
	400	1	0	3.9E-03(3)	3.9E-03 ± 6.1E-03	V130	4	1	8.2E-03 ± 9.0E-03	1.3E-02 ± 1.1E-02	V130						
	600	14	2	3.60E-03 ± 8.70E-03	1.2E-02 ± 8.5E-03	V100	72	33	1.3E-02 ± 3.5E-02	7.7E-02 ± 3.9E-02	V108						
	100	2	1	9.90E-03 ± 3.50E-02	2.2E-02 ± 1.2E-02	Y719	11	6	8.9E-03 ± 1.9E-02	2.7E-02 ± 1.2E-02	Y724						
	200-E	8	5	1.20E-02 ± 7.50E-03	1.9E-02 ± 9.7E-03	V078	46	33	2.0E-02 ± 3.6E-02	8.8E-02 ± 3.6E-02	V064						
	200-W	18	7	6.10E-03 ± 1.10E-02	1.6E-02 ± 8.5E-03	V024	87	48	1.4E-02 ± 3.3E-02	1.2E-01 ± 3.8E-02	V048						
	300	2	0	7.10E-03 ± 1.20E-02	1.1E-02 ± 1.0E-02	V123	9	7	1.8E-02 ± 2.7E-02	4.1E-02 ± 1.5E-02	V132						
400	1	0	8.8E-03(3)	8.8E-03 ± 7.9E-03	V130	4	1	9.0E-03 ± 4.7E-03	1.2E-02 ± 1.1E-02	V130							
600	14	2	8.90E-03 ± 5.90E-03	1.4E-02 ± 8.3E-03	V104	72	47	1.6E-02 ± 3.8E-02	9.4E-02 ± 4.3E-02	V104							

<sup>a</sup> 1 pCi = 0.037 Bq  
<sup>b</sup> Number of samples with measurable concentrations of contaminant  
<sup>c</sup> Average ± two standard deviations of all samples analyzed  
<sup>d</sup> Maximum ± analytical uncertainty

**Table C-21. Concentrations of Select Radionuclides (pCi/g)<sup>a</sup> in Hanford Site Vegetation Samples Collected Sitewide in 2020 and Offsite Vegetation Samples Collected in 2019.**

Location	Radionuclide	2020							
		Number of		Average <sup>c</sup> (pCi/g)		Maximum <sup>d</sup> (pCi/g)		Location	
		Samples	Detects <sup>b</sup>						
Sitewide	<sup>241</sup> Am	8	1	2.3E-03	± 5.9E-03	8.4E-03	± 5.9E-03	V034	
	<sup>137</sup> Cs	45	6	1.4E-02	± 4.2E-02	8.2E-02	± 3.7E-02	V058	
	<sup>238</sup> Pu	45	0	-2.4E-04	± 1.6E-03	2.3E-03	± 2.4E-03	V020	
	<sup>239/240</sup> Pu	45	3	4.4E-04	± 2.4E-03	4.4E-03	± 3.1E-03	V034	
	<sup>90</sup> Sr	4	6	3.5E-01	± 3.9E+00	1.3E+01	± 2.4E+00	Y719	
	<sup>233/234</sup> U	45	9	1.0E-02	± 1.3E-02	2.2E-02	± 1.1E-02	V092	
	<sup>235</sup> U	45	4	4.3E-03	± 7.8E-03	1.3E-02	± 9.2E-03	V078	
	<sup>238</sup> U	45	15	8.2E-03	± 1.1E-02	2.2E-02	± 1.2E-02	Y719	
		<b>2019</b>							
Offsite	<sup>137</sup> Cs	8	0	-1.5E-02	± 5.2E-02	1.1E-02	± 3.6E-02	V440	
	<sup>238</sup> Pu	8	0	-8.5E-04	± 2.8E-03	1.1E-03	± 4.5E-03	V434	
	<sup>239/240</sup> Pu	8	0	-1.7E-03	± 2.7E-03	-2.4E-04	± 2.4E-03	V431	
	<sup>90</sup> Sr	8	0	-1.6E-03	± 2.4E-02	1.7E-02	± 2.8E-02	V439	
	<sup>234</sup> U	8	5	1.7E-02	± 1.4E-02	2.9E-02	± 1.2E-02	V427	
	<sup>235</sup> U	8	4	9.1E-03	± 8.9E-03	1.9E-02	± 9.7E-03	V440	
	<sup>238</sup> U	8	7	1.5E-02	± 1.8E-02	3.3E-02	± 1.2E-02	V440	
<sup>a</sup> 1 pCi = 0.037 Bq <sup>b</sup> Number of samples with measurable concentrations of contaminant <sup>c</sup> Average ± two standard deviations of all samples analyzed <sup>d</sup> Maximum ± analytical uncertainty									

**Table C-22. Radionuclide Concentrations in Liquid Effluents. (2 Pages)**

Facility	Sample Location	Radionuclide or Analysis	Number of		Average Concentration ( $\mu\text{Ci}/\text{mL}$ )	DCS ( $\mu\text{Ci}/\text{mL}$ )	DCS Fraction (%)
			Samples	Samples >MDA			
ETF	Verification Tank	americium-241	4	0	--	--	--
ETF	Verification Tank	Cesium-137	4	1	3.6E-08	3.0E-06	1.2%
ETF	Verification Tank	gross alpha	5	0	--	--	--
ETF	Verification Tank	gross beta	5	2	1.2E-08	3.0E-06 <sup>a</sup>	0.4%
ETF	Verification Tank	iodine-129	4	0	--	--	--
ETF	Verification Tank	neptunium-237	4	0	--	--	--
ETF	Verification Tank	plutonium-238	4	0	--	--	--
ETF	Verification Tank	plutonium-239/240	4	0	--	--	--
ETF	Verification Tank	radium-226	4	2	8.5E-10	8.7E-08	1.0%
ETF	Verification Tank	strontium-90	4	0	--	--	--
ETF	Verification Tank	technetium-99	4	0	--	--	--
ETF	Verification Tank	tritium	4	4	2.6E-04	1.9E-03	13.9%
<b>ETF Sum of Fractions =</b>							<b>16.5%</b>

**Table C-22. Radionuclide Concentrations in Liquid Effluents. (2 Pages)**

Facility	Sample Location	Radionuclide or Analysis	Number of		Average Concentration ( $\mu\text{Ci/mL}$ )	DCS ( $\mu\text{Ci/mL}$ )	DCS Fraction (%)
			Samples	Samples >MDA			
TEDF	Building 6653	gross alpha	14	0	--	--	--
TEDF	Building 6653	gross beta	14	2	9.5E-09	3.0E-06 <sup>a</sup>	0.3%
TEDF	Building 6653	tritium	5	0	--	--	--
<b>TEDF Sum of Fractions =</b>							<b>0.3%</b>
<sup>a</sup> DCS value for cesium-137 ETF = Effluent Treatment Facility TEDF = Treated Effluent Disposal Facility MDA = minimum detectable activity DCS = derived concentration standard for ingested water from DOE-STD-1196-2011							

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## C.7 References

- 40 CFR 61. Appendix E, "Compliance Procedures Methods for Determining Compliance with Subpart I," Table 2, "Concentration Levels for Environmental Compliance." *Code of Federal Regulations*, as amended. Online at [http://www.ecfr.gov/cgi-bin/text-idx?SID=da9d22320b65cc64e47ba92143fafad7&mc=true&node=ap40.10.61\\_1359.e&rgn=div9](http://www.ecfr.gov/cgi-bin/text-idx?SID=da9d22320b65cc64e47ba92143fafad7&mc=true&node=ap40.10.61_1359.e&rgn=div9).
- 40 CFR 141. "National Primary Drinking Water Regulations." *Code of Federal Regulations*, as amended. Online at [http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr141\\_main\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr141_main_02.tpl).
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- WAC 246-290. "Group A Public Water Supplies." *Washington Administrative Code*, as amended. Online at <http://apps.leg.wa.gov/wac/default.aspx?cite=246-290>.